

ECONOMIC AND COMMERCIAL GEOGRAPHY

(With a detailed treatment of India and Pakistan)

BY

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PREFACE

In the commercial and industrial world, a knowledge of Economic and Commercial Geography is daily assuming increasing importance and it is in the fitness of things, that it has been recognised as an important subject for study, specially for students who are preparing themselves for a commercial career. The present work has been written specially for such students.

This book does not pretend to have covered entirely that vast mass of facts and statistics, necessary and unnecessary, which sometimes form the material of the books on Economic Geography, at present available to the Indian students. Although elementary, it is hoped that the book will be of much assistance to the Commerce students of the Universities of India, and open the way for them to the study of more comprehensive works on the subject. This treatise divides itself into three parts. In the first part, an attempt has been made to present the principles of Economic Geography on a world basis. The second part is concerned with the geographical description of the important countries of the world and explanation of the local differences upon which depends the existence of international trade and commerce. The third part has been devoted to a detailed treatment of Indian Union and Pakistan. No pains have been spared to make the book up-to-date, but there are obvious limits to our task, in a world where events are moving fast—perhaps too fast for many of us.

A book of this type can scarcely lay any claim to originality and wherever possible our debt to various eminent authors has been acknowledged in the foot-notes. Our thanks are due to S^j. Ganesh Chandra Basu of Messrs Bookland Private Ltd., without whose invaluable assistance this work could not have been published.

We sincerely believe that this humble work will serve its object, and be of some use to those for whom it is intended.

Calcutta }
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M. N. B.
A. T. C.

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CHAPTER 1

INTRODUCTION

Nature, Scope and Method of Geography

Definition.—Geography etymologically means a *writing about the earth*. And indeed it originated from an attempt at systematizing the facts brought to light by early explorers and travellers. Hence the old text-book definition of the subject as “*a description of the world and its inhabitants*.” Modern writers do not regard Geography as a purely descriptive art. It is now-a-days contended that Geography is a science. It aims at explaining the causal relation obtaining between man and the world, or, as it is commonly put, between man and his physical environment. Hence the modern definition of the subject as “*the study of the world as the home of man—of the physical environment of the human species*.”¹ The old definition, it may be noted, was not substantially incorrect ; for Geography is still a study of the world and its inhabitants ; but—and that is the all important point—man and the world are no longer to be treated separately, but only in their mutual relation.

Method.—Modern geography, in effect, is ‘causal geography’ ; it looks for causes and tries to trace their influence ‘in the world of to-day.’ Thus it works, in common with all other sciences, from cause to effect.² The facts discovered by early explorers and systematized by geographers of their day were, no doubt, capable of study with a view to determine their underlying causes ; and those who actually did study them that way took the reverse order of working from the effect to the cause. With the dawn of modern geography, however, it came to be realized that a handful of causes are at the root of a multitude of otherwise unrelated facts. So the modern

Etymology.

Old view.

Modern view.

Causal Geography’.

Old method of working from effect to cause.

New method of working from cause to effect.

¹ Stamp, *Modern Geographical Ideas*, p. 3.

² Stamp, *A Commercial Geography*, p. 1. See also Case and Bergsmark, *College Geography*, p. VII.

geographer has taken to the course of working from cause to effect.

Scope.—Geography then is concerned with two fields of inquiry—environment and man. It must, therefore, deal with the origin and evolution of this environment as well as with human life and activity. Hence the geographer is led into the fields of various other sciences—Astronomy, Meteorology, Geology, Physiography, Botany, Ecology, Sociology, Economics, etc. But Geography is not a mere collection of facts from some other sciences. It is itself a dynamic science that studies the mutual relationship of man and his physical environment and, as such, its scope is very wide and extensive. The geographer obtains various informations from other sciences, but he uses them for his special purpose, *viz.*, to study the human environment as such. No other science is concerned with that environment as it is. “To geography belongs the task of making clear the relationship existing between environments and the distribution and activities of man.”¹

The fact is that Geography is not so much a science as a scientific point of view² just as history, in effect, is. And as such, it has no definite subject-matter at all. In order to acquire a content, it has to associate itself with some adjective or other ; for only in that way can there be any meaning in the terms ‘political geography,’ ‘commercial geography,’ etc. In other words, the sphere of Geography is as wide as the sphere of human activity itself. This is one of the reasons indeed why “the claim has frequently been made that geography is the mother of sciences.”³

Economic Geography is thus defined as “the study of the influence exerted upon the economic activities of man by his physical environment.” Man is engaged in certain occupations or activities to obtain the satisfaction of his major material needs, *viz.* food, clothes, shelter, fuel, tools

¹ Case & Bergsmark, *College Geography*, p. IX. See also Stamp, *Modern Geographical Ideas*, p. 3, and J. F. Chamberlain, *Geography*, p. 17.

² Stamp, *Modern Geographical Ideas*, p. 44.

³ Case and Bergsmark, *College Geography*, p. VII.

and raw materials of industry. Economic Geography deals with such productive occupations and attempts to explain why certain places are outstanding in the production and exportation of various commodities and why others are significant in the importation and utilization of these things. *Commercial Geography* is really a part of the study of Economic Geography. It is, strictly speaking, a study of the exchange of products ; of the places where these are produced, of the methods of their production and the means of their transportation.

QUESTIONS

1. "Geography is the study of the world as the home of man"—Explain.
2. The claim has often been made that Geography is a science, neither more nor less. Is it a valid claim? Give reasons for your answer.
3. Discuss the scope and function of Geography as a science.

CHAPTER II

The Environmental Factors

Man & Environment.—The earth is the great reservoir whence man derives the raw materials with which he builds his own world. The economic activity of man is directed towards the production of goods from the raw materials supplied by nature. The distribution of natural resources depends on geographical factors such as location, topography, climate, soil etc., and all these factors act as controls in determining the economic activities of man. They are often referred to as "*Geographical Control*." But with the advancement of civilization and knowledge man has learnt to overcome the difficulties imposed by nature. Physical factors do not determine absolutely the character of the economic life of a region now-a-days. Man has discovered the resources and laws of nature and with great advantage to himself has adjusted his activities to them. But even now the physical environment sets

Commercial
Geography.

Geographi-
cal Control
vs.
Geographi-
cal In-
fluence.

broad limits to human activity and enterprise and environmental handicaps are not overcome without cost. Hence many prefer to call it "*Geographical Influence*"; man in his economic life, is greatly influenced by environmental factors but not really controlled by them. He necessarily adapts himself to environmental conditions.

If then Geography is to be a study of the world as the home of man, our first task here would be to analyse the environment which constitutes the world. It must also be noted before we proceed with the analysis that environment, though capable of analysis, really affects us as a whole. The task of the geographer is, therefore, twofold; he must analyse the different factors of the environment so as to trace the influence exerted by each severally, and then take into account the influence exercised by the whole collectively. What then are the factors constituting the physical environment?

1. **Location or Position.**—Of these location or position is one, and by many it is regarded as the prime factor. India holds a central position in the East, the British Isles are centrally situated in the Land Hemisphere of the globe, New Zealand is on the margin of the habitable world, and so on. These situations have profound influence on the national economy of all these countries. Great Britain's pre-eminence is largely traced to the ideal position she holds; she can easily exercise control over oceanic commerce passing through the Atlantic and the North Sea; hence her plantations in America thrived quite well, whereas those of France and Spain steadily declined: it was British sea-power that made possible the United States of America. In the past India similarly was in more or less effective control of trade and commerce passing through the Indian Ocean, the Arabian Sea and the Bay of Bengal. The fabulous wealth of India was not a little due to that factor. On the other hand, New Zealand is distinctly handicapped in her national economy owing largely to her peripheral situation. Much of her trade is with Great Britain, but since she is far off from the Mother Country

she must specialize in commodities that can stand the long voyage and yet pay the enormous cost of transport.¹

Location also determines the climatic condition of a country. A country may be situated near the equator or any of the poles, and its climatic condition will vary accordingly. And with this will there be seen a corresponding variation in the flora and fauna of the country. This, in turn, cannot but have profound effect on the agriculture and industry of that region. Thus location has an indirect and yet unmistakable effect on the trade and commerce of a place. The United States of America, despite her enormous territory, must always be dependent on foreign supplies for the equatorial and tropical products like rubber, cane-sugar, cocoa, tea and the like ; Canada must maintain the closest possible trade relations with the British West Indies for a similar consideration ; Russia cannot let her hold on Turkestan go without serious consequences to her own cotton industry.²

Influence of location on climate, flora and fauna.

Influence of location on trade and commerce.

Now-a-days, however, the ill effects of a marginal position can be largely mitigated by means of railways, auto-tracks, steam ships, aeroplanes, the telephone, the radio, etc.³ But they cannot be totally removed. Position or location is an environmental factor, which can be modified but not altered materially.⁴ In the past it took about six months to come to India from Great Britain, and nearly a year to reach Australia from the British Isles ; to-day a very short time is required for a flight to India from England, or Australia. Although distance has greatly been minimized to-day by the development of modern means of travel, its relativity still remains. India will always be nearer to England than Australia.

Man's influence on location.

2. Physical Features.—The second of these factors, according to Stamp⁵, is the surface relief or physical

Physical features and distribution of economic activities.

¹ Stamp, *A Commercial Geography*, p. 5.

² Stamp, *Modern Geographical Ideas*, pp. 33-34.

³ Case & Bergsmark, *College Geography*, p. 45.

⁴ Stamp, *A Commercial Geography*, p. 6.

⁵ See, for example, *A Commercial Geography*. It is, however, doubtful whether a gradation as suggested by Stamp of the environmental factors is possible

features of a country. The influence of this factor on the economic development of a region is very great.

- The crust of the earth shows three important relief features—mountains, plateaus and plains. About one-third of the land area of the world lies at elevations of over 2,000 feet and much of this area may be classified as mountains. It is difficult to build towns and villages on the mountains. Agriculture can be practised in the valleys having relatively flat land. Usually, stock raising and dairies are of greater importance there than cultivation. Transport is also difficult in mountainous regions. Construction of routes is generally through the low passages, known as passes which usually are few in number. Minerals are often found in mountainous areas but it is rather difficult to locate and work them. So the mountainous regions are thinly populated. Plateaus may vary greatly in elevation. High plateaus as that of Tibet are not suitable for human habitation. In tropical lands plateaus of moderate elevation offer the best sites for human activities. They are in most cases healthy, densely populated and are well known for their diversified agriculture, industrial activity and their high degree of economic and cultural progress. Plains are lands of low relief and usually of low altitude. As mountains generally repel settlement, so, on the other hand, plains invite occupancy, and unless the latter are thickly forested or deficient in rainfall, they become densely populated.¹ Of the enormous population of India nearly one-third are found in the deltas of the Ganges and the Indus. Holland, Belgium, the plains of France, Germany and the British Isles, the Nile Valley etc., are the great centres of population in the world, because of the levelness of the land and the greater facilities for carrying on agricultural and industrial work.
- Mountains.
- Plateaus.
- Plains.

Man's
influence
on topo-
graphy.

Man's influence on the topography or physical features of the earth's surface is, however, comparatively small. It is true that he can mitigate the ill effects, for example, of a mountain barrier by cutting a tunnel across it, or reclaim

¹ J. F. Chamberlain, *Geography*, p. 117.

sub-merged lands from shallow seas or establish contact between oceans separated by narrow isthmuses, yet he can, by no means, materially alter the topography of a country by blowing up mountains so as to reduce it to a level plain, or erecting a mountain barrier where there is none. Switzerland will always be a mountainous country and Holland a level plain, and man must always modify his life according to the topography of the place he lives in.

3. **Geological Structure.**—The surface features of a country are really the reflection of its underlying geological structure,—its outward and visible result.¹ The geological structure of a country has great bearing on its trade and commerce. The areas of old hard rocks are comparatively barren from the point of view of agriculture, but are generally associated with metalliferous minerals. The areas of young soft rocks, on the other hand, are commonly suitable for agriculture, and are generally associated with non-metallic minerals like coal and oil. To the former class belong the major plateau regions of the world—the Brazilian plateau, the Guiana Highlands, the greater part of Africa, Arabia, Peninsular India, Indo-China, the great plateau of Australia, Central Siberia, Scandinavia, the Highlands of Scotland and North-Western Ireland. The great Laurentian Shield of Canada and the vast Russian platform belong to another subdivision of this group of ancient rocks. To the second group belong the Central Plains of North America, the plains of the Orinoco, Amazon and Paraguay in South America, the North European Plain, the lowlands of Western Siberia, the valleys of the Tigris, the Euphrates, the Indus, the Ganges, the Brahmaputra, the Hwang Ho, the Yangtze Kiang, the Si Kiang, and the central plains of Australia. The great fold mountains—the Alps, the Himalayas, the Rockies and the Andes—belong to this second group.

The influence of man on his geological environment is even smaller than that on the surface features. He can, of course, modify the natural barrenness of the soil by the use of suitable manure, plant stout trees for the preven-

¹ Stamp, *A Commercial Geography*, pp. 6-7.

tion of soil erosion and do other things of a like nature ; but even in these things he can at best be only partially successful. But can he ever put a gold field where there is none ?

Climate
and
weather
disting-
uished.

4. **Climate and Weather.**—Climate is by far the most important influential factor of our physical environment. Almost at every step our activity is governed by the weather of the moment. Climate and weather are basically the same. Weather is the average state of the atmosphere in a certain place at a certain time. Thus weather changes from place to place and also from day to day in one place also. Climate is the state of weather conditions in a place over a long period. The chief elements of climate are rainfall, temperature, humidity and winds. Climate is the most variable factor in the world's physical environment.

Difference
of Climate.
Reasons.

The difference of climatic conditions may be attributed to the following factors :—

(i) Other conditions being equal the countries further away from the equator are cooler than the countries on the equator or near about it.

(ii) The higher a place is from the sea level the cooler the temperature is. This is due to the less density of air and the presence of less aqueous vapour in the higher altitudes. It has been observed that for every 300 ft. of ascent there is a fall of 1° temperature.

(iii) Coast lands have an equable climate. The sea cools the land beside it in summer and warms it in winter, because water is more slowly heated and cooled than land.

(iv) Winds coming from cold regions are cold and those coming from warm regions are warm. A heated land or water surface results in ascending currents of heated air and the formation of a low pressure system. A cooled surface conversely leads to a high pressure system. Air currents flow inwards deflected by earth's rotation to fill up a low pressure area. They flow outwards from a high pressure area to low pressure areas surrounding. When the winds blow from sea to land they cause rainfall. When

they blow from land to sea they are dry winds. Thus the winds control rainfall.

(v) Cold ocean currents cool the climate of a country but warm currents make the climate of a country warm and equable.

(vi) Presence of forests in a country makes the climate equable. They cool the heat of the day and temper the cold of the night and prevent the loss of moisture by evaporation.

Climate is a factor of the environment which makes itself felt at every step of our life. Climate controls the distribution of vegetation in different areas of the earth's surface. Heat, rainfall, snowfall and wind are the main factors for the growth of plant life besides soil factor. It is owing to the variations in the amount and seasonal distribution of the climatic factors that different kinds of vegetation occur in different parts of the earth's surface. Thus we find grasslands, deciduous forests, coniferous forests, deserts and semi-deserts etc. in this world of ours.

Agriculture is also primarily dependent on climatic factors. Each cultivated plant is suited to a certain range of climate and soil. It is impossible to grow crops in climates entirely unsuitable for them. Thus we find that different regions of the earth's surface produce different types of crops. Rice will not grow in England ; apple will not grow in Bengal ; jute will not grow in France.

The localisation of manufacturing industries is frequently influenced by climatic factors. This is particularly evident in the cotton textile industry. This industry thrives in a place where the climate is moist and damp, since threads tend to break in a dry atmosphere. Lancashire in England and Bombay Presidency in India are the best examples. Wool spinning requires a relatively drier type of climate. Flour mills require a dry climate. Cinema industry is established in regions having a dry and sunny weather. The supply of labour and raw materials for industries is also dependant on climatic factors.

Climate
and
Man.

Climate influences man's activities on land, on sea and in the air. "The type of clothing he wears, the kind and amount of food he eats, the character of the house he lives in, his means of transport, the games he plays or watches—all these and many other features of everyday life are vitally affected by climate." Man's health and energy are influenced by climate both directly and indirectly. Heat makes man idle whereas cold makes man hardworking. The men in the warmer climates are cheerful but of a lazy disposition. The men of the colder regions are sluggish but steady in their work. Greatest industrial development has taken place in the temperate regions.

But man can adjust himself to all climatic conditions. His clothes, his houses, his holidays all are but different adaptations to his climatic environment. In very cold countries the rooms are filled with heating apparatus ; in hot regions there are cooling agencies. Drainage systems have been elaborated to remove excess of water and irrigation systems have been introduced to overcome shortage of water supply. But man has not yet been able to prevent rain or cold when necessary or have rain when there is want of water.

Dependence
of soil
on other
factors.

Natural
vegetation
belts.

5. Vegetation and soil.—Almost the entire land surface of the globe has some kind of vegetation. Vegetation is "an index of the interaction of the foregoing factors."¹ It reflects the particular location of the area in which it grows, the physical conditions of that area, as well as the climate of the place. Of course vegetation springs directly from the soil and thus must reflect the character of the soil. But soil itself is a product of the following three factors—(1) the geological structure of the underlying rocks, (2) the climatic conditions of the place, and (3) the type of vegetation which has been growing there. It has been found that each of the major climatic regions of the world has its own characteristic type of natural vegetation. But it is also a fact that man has largely

¹ Stamp, *A Commercial Geography*, p. 8.

rooted out the natural vegetation of several regions. Yet it is possible to divide the surface of the earth into at least twelve belts of natural vegetation, because the character of the artificial vegetation which man has substituted in these areas is also largely governed by the factors of soil and climate. Thus where natural vegetation has been rooted out, we come across a characteristic crop suited to that region. It is possible, no doubt, to extend the range of crops ; but this obviously has its limits,—we cannot yet grow rubber, cocoa, banana in the temperate or polar regions ; nor is it yet possible to grow grapes and apples in the Tropical Rain Forests.

Introduc-
tion of
crops
does not
interfere
much with
the natural
vegetation
belts of
the earth.

6. **Animal Life.**—Just as the combined influence of location, physical features, geological structure, soil and climate is reflected in the natural vegetation of a country, so is animal life largely governed by the vegetation of the place. The monkey, for instance, is an arboreal creature living for the most part in the Tropical Rain Forests ; the antelope is chiefly found in the wide and open grassy plains, the white bear is adapted to a life in the Arctic wastes, and so on. But this is true not only of wild animals, but of those domesticated by man as well. Since the wide grassy plains are especially capable of supporting wild grass-eating animals, man is also able in those regions to raise and tend great herds of cattle ; it also explains the enormous concentration of sheep in the Temperate Grasslands of Australia and New Zealand. And though man is far from conquering the animal world yet, his influence on animal life appears to be much greater than on any other factor of the physical environment. Yet he cannot ignore the characteristics of the animal life of his region ; he cannot rear up cattle in the desert or the polar regions ; the cattle farmer must find out suitable pasture ; the apiarist (one who keeps bees) would do well to have buckwheat and white clover for his bees if he is to get an abundant supply of honey and wax ; the oyster farmer must cover his fishing grounds well for the protection of his oysters from starfish, black drum, stingray, etc.

Vegetation
and
Animal life.

Man's
influence
on animal
life.

QUESTIONS

1 Give a brief description of the chief factors of physical environment, and indicate the influence of each on man and of man on each of these factors.

2. What do you mean by 'Geographical Control' and 'Geographical Influence' respectively? Which appears to you to be the more appropriate conception, and why?

3. What may be the general commercial value of the areas of ancient rocks and those of young rocks respectively?

4. Write a short note on the effect of climate on manufacturing industries.

CHAPTER III

THE MAJOR CLIMATIC REGIONS OF THE WORLD

Diversity of climate in different regions.

Similarity of climate in different regions.

Similarity of climate associated with similarity of soil and vegetation.

Climatic and Natural Regions.—The same type of climate does not prevail all the world over. Countries near about the equator are generally hot and humid; those in the middle latitudes commonly possess a dry type of climate; the polar regions, again, are cold and arid. Thus, for instance, the climate of Great Britain is quite different from that of India. Not only that; even in the same country different regions may have different types of climate. Thus, for example, Sind or Rajputana differs considerably in this respect from Bengal or Assam. But there is another side of the picture, too. It is found, for instance, that the climate of the lands surrounding the Mediterranean Sea is very similar to that of so distant a place as California in North America or to that of certain parts of Western and South Australia. And since climate exercises a profound influence on soil and vegetation, regions having similar climatic conditions are also much alike one another in respect of soil and natural vegetation. And what is perhaps more important from the human point of view, agricultural methods which have proved suitable to one of these regions prove to be equally so in any one of the other regions, provided that the economic and other conditions are equal. The products which flourish well in one

area will also thrive equally well in another, if the two places agree in climatic conditions. Oranges, for instance, thrive in Spain, California, the Cape Province of South Africa and Western and South Australia. "So there has been evolved the conception of a series of major natural regions, of major environments."¹ The natural regions are the areas which agree in climate, vegetation and the general method of living. It is one of the most fruitful conceptions of modern geography, and was first enunciated by Professor Herbertson of Oxford, who defined a natural region as "*an area of the earth's surface which is essentially homogeneous with respect to the conditions that affect human life.*"² It has now been found that the entire land surface of the earth may be divided into nearly a dozen well-marked areas, which can be defined either in terms of climate or of vegetation.³ But before proceeding with the detailed description of these regions we must note that these divisions are not like watertight compartments; no sharp line can be drawn to mark off one region from an adjacent area, one type generally tending to merge by degrees into another. And since the change is very gradual and not quite abrupt except in regions sharply outlined by such natural barriers as oceans and mountain ranges, much of the intervening tract between two regions can best be regarded as a transitional area. The physical conditions, moreover, of two widely separated places are not fully identical; and since location and physical features have well-marked influences on the climate of a place, considerable local variation is seen even in areas grouped together as forming one natural region. A classification of natural regions primarily on a climatic basis can at best be only an approximation, and the placing of regions in a particular category means that they have more simi-

Hence the feasibility of employing similar agricultural methods in regions having same type of climate.

Natural regions.

Division of earth into about twelve natural regions.

Divisions not like watertight compartments.

¹ Stamp, *A Commercial Geography*, p. 11.

² Herbertson, "Major Natural Regions: An Essay in Systematic Geography," *Geographical Journal*, Vol. XXV, p. 300 ff

³ Geographers are not, however, in complete agreement as to these divisions. What one regards as a major type another merely looks upon as a sub-type. Yet the basic principle has remained the same since Herbertson's enunciation of the conception of natural regions.

Perplexities
in naming
natural
regions.

liarities than differences in common. In naming these regions geographers, however, try generally to keep close to the dominant character of the climate in each. But since the influence of climate on vegetation is most intimate, a specified region is sometimes named after its prevailing vegetation. Thus, for instance, we have such names as Temperate Grassland or Prairie and Coniferous Forest Belt for regions having a Temperate Continental Climate and a Cold Temperate Climate respectively. Sometimes, again, natural regions are named after a place held to have quite typical climatic conditions. Thus there are regions with China type of Climate or the Sudan type. But we must always remember that the climate—not place—is the chief factor here ; vegetation though important is largely dependent on it. So it is desirable to use climatic names. And if still natural regions must have 'regional' names, it is better to christen them after the climatic zones of the earth than after place-names having little, if any, real geographical value.

1. REGIONS OF LOW LATITUDES

Extent.

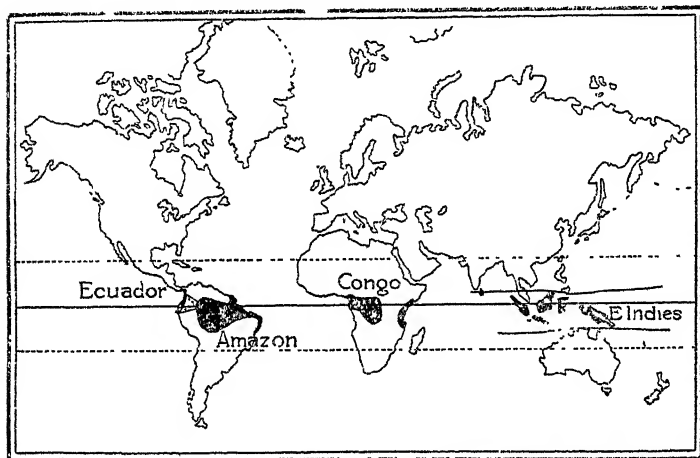
1. **The Equatorial Regions.**—The Equatorial Regions, as the name implies, stretch almost as a continuous belt on both sides of the Equator between 5° *N.* and 5° *S.*, and occupy an area of about 600 miles in width encircling nearly the entire land surface of the earth. The range, however, is often wider ; but the extreme limits rarely exceed 10° *N.* and 10° *S.* We can easily distinguish three main regions within this belt :

- (1) *The Amazon Basin of South America ;*
- (2) *The Congo Basin of Central Africa ; and*
- (3) *The islands of South-Eastern Asia together with the adjacent areas of the mainland.*

Parts of Ecuador to the west of the Amazon Basin and the narrow coastal plain adjacent to Mombasa, Zanzibar and Dar-es-Salaam in East Africa also belong to this group.

The climate prevailing throughout this wide area is characteristically known as the *Equatorial Climate*. It is

typical, however, in the basin of the Amazon; hence the name '*Amazon type of Climate*'. It is also described as the climate of the hot wet selvas, because the Amazon forests are locally known as the selvas, a name given to it by the early Spanish settlers in South America. The temperature of this region is high all through the year; the average range, especially in the typical areas, is extremely constant, fluctuating only between 78°F. and



The Equatorial Regions

Often also called Tropical Rain Forest Regions. The transitional nature of some of the adjacent areas should be borne in mind. Some writers would include the Guinea Coast of West Africa as well as the West Coast of India in the Equatorial Regions because the forests are much similar.

80°F.; and the seasonal range is usually only 5°F., and often less. The coldest month can, thus, scarcely be distinguished from the hottest. The diurnal range is also small,—usually less than 20°F., often even less than 10°F. But we should not suppose that these are really the hottest parts of the world; for although the temperature is uniformly high all the year, it seldom rises above 100°F., and mostly does not rise above 90°F.; and on the other hand it does not, as a rule, fall below 70°F.¹ These are the

(a) Temperature.

(b) Rain-fall.

¹ Stamp. A Commercial Geography, p. 13. "The Equatorial regions are popularly, but erroneously, regarded as the hottest

- regions of 'rain-at-all-seasons' ; hence there is no typically 'dry season' except in a relative sense. Since the Equatorial lands lie, in the main, in the Belt of Calms or Doldrums, the rains are mostly convectional. As the sun shines almost vertically overhead it brings about, in the early part of the day, rapid evaporation and an upward current of air ; thus clouds form easily, and frequently there is a heavy downpour in the evening, accompanied by thunder ; by the late evening the sky is clear again. But although rain falls all the year round in these regions, there are periods of maximum precipitation : areas bordering on the Equator usually have two seasons wetter than the rest ; those lying on the fringes of the Equatorial Belt usually have one such period. This is mainly due to the annual shift of the earth's thermal equator ; the wettest season or seasons occur, as a rule, shortly after the sun crosses the Equator. The average rainfall for the year ranges from 70 to 80 inches, often it is higher. But regions cut off from maritime influences usually have less rain. Although the Trade Winds and the Monsoon originate in areas north and south of the Equator, the whole of the Equatorial Belt is not cut off from their influence. The fringes of the Belt as well as maritime stations within it enjoy cool breezes, but the interior forest areas are deprived of their beneficial effects. "Typical of the equatorial lands is the Belt of Calms or Doldrums where there is no marked wind or wind direction."¹
- (c) Sea-sons. (d) Winds. (e) Vegetation.
- Vegetation is typical. Uniform heat and abundant moisture help a luxuriant growth of plants ; vegetation is

in the world. The average temperature, it is true, is uniformly high, and the constantly damp, steamy atmosphere may be enervating, but the Equatorial climate is far from being the most trying in the world. The absence of really high temperatures—the thermometer rarely rises above 100°F.—and the pleasantly cool rains which accompany the sea breezes impart a welcome movement to the air. This is particularly the case in maritime situation . . . where the land and sea breezes impart a welcome movement to the air. The climate is found at its worst in the interior of the great Equatorial forests where the air is absolutely still. The effect of elevation is to lower the average temperature and, sometimes, to result in a slightly greater range"—Stamp Asia, p. 25

¹ Stamp, A. Commercial Geography, p. 13.

much more profuse in the Equatorial Regions than in any other part of the world. Where the lowlands are rain-soaked throughout the year, the earth is often so smothered by growing vegetation that the sunlight scarcely reaches the forest floor. There is, thus, a 'fierce competition' for light and air, resulting in the growth of giant trees, with enormous crowns of leaves at the tops. This is particularly well marked in the Equatorial Forest regions of South America—the celebrated Amazon Basin ; those of Asia and Africa are comparatively open. Most of these trees, no doubt, have periods for shedding their leaves ; but these are of short duration, and the shedding periods of different species come at different seasons of the year ; so no forest is ever appreciably bare of leaves, and hence the name 'Hot Wet Evergreen Forests.' The trees are—nearly all of them—of the hard-wooded species. And two major difficulties prevent their thorough exploitation,—(a) the great variety of the trees, and (b) the character of the timber. It is extremely difficult and expensive to extract a particular type of wood from these forests owing to the great variety of tree species, and it is almost equally costly to work them because of their hardness. Yet when worked they furnish magnificent 'cabinet' wood. These forests are also difficult to penetrate and the climate is extremely debilitating, especially in the interior of the denser forests. Animal life, particularly in the denser parts, is almost wholly restricted to the tree-tops ; monkeys are typical ; tree-frogs and tree-lizards as well as birds are numerous, and, of course, a wealth of insect-life characterizes these regions. Birds are generally abundant and they vary from almost the tiniest to the largest sizes, often with gorgeous plumage.

Difficulties
in exploit-
ing forest
products.

Animal
life.

The popular idea is that the natives of these 'regions of debilitation' are very backward and stunted both physically and mentally. Thus according to Stamp, the American-Indian tribes of the Amazon and the pigmies of the Congo Basin are typical of these areas, especially of the denser equatorial forests which, be it noted, are very sparsely inhabited. They are said to be hunters, living on the fruits, nuts and games of the forest. Although there

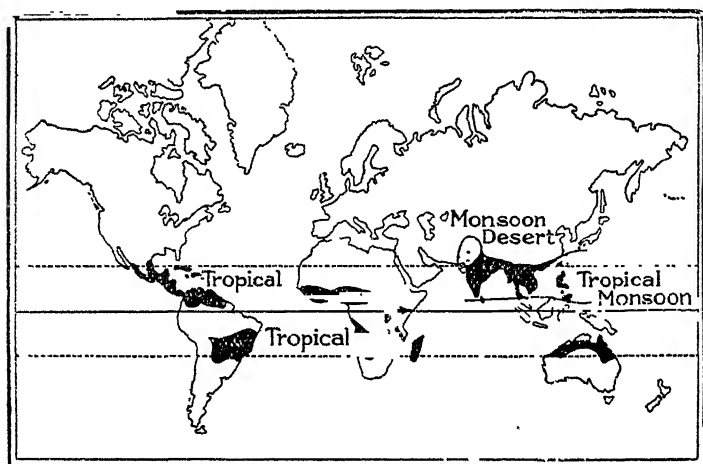
Man.

Hunting, gathering and cultivation. are still found races in these regions who subsist on fruits and nuts and games, the majority of the people living even in the Amazon and the Congo Basins are primarily farmers :—"they may fish at times, and gather fruits and nuts, primarily to supplement the agricultural products."¹ Even Stamp himself admits that, "the more open Equatorial forests, where clearing is easier and Nature is bountiful in gifts, are the home of many sturdy, if somewhat lazy, races. Of these the Malayas, the Javanese, and the Dyaks of Borneo are good instances."

Typical Products. The chief products of these regions are rubber, palm oil, cocoa and sugar. Plantations of rubber are entirely confined to countries enjoying an equatorial type of climate, and indeed the belt along which rubber cultivation can be profitably carried on is, with good reasons, said to be the limit of the Equatorial Belt as well. Rubber was originally a native of the Amazon, whence it was introduced into India and Malaya in the latter part of the last century (about 1876). The bulk of the world's supply of this commodity now comes from the plantations of Southern India, Ceylon, Malaya and the Dutch East Indies. The crude rubber of Brazil and the Belgian Congo is not as important as it formerly used to be. Rubber is now chiefly obtained from the Para rubber tree. Cocoa is another, if a little less typical, product of the Equatorial Regions. The bulk of the world's supply of this commodity used to come formerly from Central and South America ; now about half the world's production is obtained from the Gold Coast region of Africa.

2. **The Tropical Regions.**—The Tropical Regions, as the name implies, lie within the Tropics of Cancer and Capricorn on both sides of the Equatorial Belt. The Sudan of Africa is commonly said to be typical of them ; hence the name '*Sudan type of Climate*'. And since the typical vegetation is grass interspersed with scattered trees, it is often called '*Tropical Grassland Climate*.' It is very interesting to note that the vast stretches of tropical grassland lie between the Equatorial Forests on the one hand and the Hot Deserts on the other. The temperature.

of these regions during the summer months often even exceed that of the regions lying within the Equatorial Belt. But the chief point of contrast lies in the great seasonal range of temperature. Areas lying close to the Equatorial



The Tropical and Tropical Monsoon Regions.

Belt as well as maritime stations, where rainfall is naturally heavy, experience small variation of temperature between the hottest and the coldest months ; but in the drier parts of the Tropical Belt there is frequently a seasonal variation of 30°F., or even 40°F. Correspondingly the diurnal range of temperature in these drier regions is also appreciably large. Rainfall also shows a corresponding variation. Rainfall.

In some of the wettest parts it may be as much as 200 inches a year, sometimes even considerably more ; others have an average of 70 to 80 inches ; whereas on desert borders it may be 15 inches or less. What especially distinguishes the Tropical Belt from the Equatorial Belt in respect of rainfall is the presence in the former of a distinctly dry and a distinctly wet season. Geographers and climatologists generally distinguish three seasons—(a) Seasons. a cool dry season, (b) a hot dry season, and (c) a rainy season. The cool dry season is followed invariably by the hot dry season, when generally unbearable heat reigns supreme and some of the highest temperatures of the world

Vegeta-
tion.

are recorded ; then set in the rains, which result in considerable cooling of the atmosphere ; as soon as the rains are about to be over it becomes a little hot again, but the heat never reaches its maximum owing to the advent of the cool season. The spring and the summer are the seasons of rainfall, and the winter is almost wholly rainless. The hot season in the Northern Hemisphere ends in about April or May to be followed by the wet season. Rains begin to be scarce by the end of August, sometimes even earlier, and about the middle of the following month they have generally stopped altogether. Winter then follows close upon the heels of the rainy season. The typical vegetation, as already mentioned, is grass interspersed with scattered trees. This is because grass springs up easily where there is a fairly good supply of rainwater, and it has a resting period during the dry seasons (winter and summer). But trees generally require a fairly constant supply of water all the years, and very many species cannot flourish during the dry seasons.

Man.

Hunting and cattle farming are said to be the major occupations of the savana people. But agriculture is by no means of lesser importance, since "the natural grass which flourishes in the savana may be replaced by the cereal. . ."¹ Maize and millets amongst the cereals as well as cotton, sugarcane, groundnuts and various oilseeds are widely cultivated in these regions generally. But at present there are formidable difficulties in the way of the development of many of these regions. Of these the shortage of labour probably comes to the forefront ; the grasslands are mostly very thinly populated ; those of Australia are practically uninhabited, and in many parts of the African savanas the population is scarcely 20 to the square mile ; in the South American grasslands, again, the density is only four persons per square mile. Other difficulties generally are the poor transportation facilities, distance from the markets, and, especially in South America, frequent political unrest and the consequent revolutions.²

¹ op. cit., p. 19.

² H. J. Mozans, *Up the Orinoco and Down the Magdalena*, p. 128.

3. **Tropical Monsoon Regions.**—There is very little difference between a Tropical Grassland climate and a Tropical Monsoon climate, except in respect of rainfall. In winter, Monsoon lands are under the influence of normal Trade Winds. In early summer the situation of the regions, on the fringe of the great land masses, cause the land to be greatly heated. Thus the low pressure in summer leads to the reversal of the Trade Winds. Moist and cool winds from the sea are drawn towards the land, and they bring heavy rains. Hence the Tropical Monsoon regions are lands of heavy summer rainfall. The winters lasting from November to January, have very little rain. The rains break in by the end of May and last till October. The rainfall in the monsoon lands depends largely on surface relief. India is the most typical of the Tropical Monsoon lands ; even the areas falling strictly outside the Tropic of Cancer are governed almost wholly by the Tropical Monsoon Climate.¹ Besides India, Indo-China and South China, the Monsoon Climate is found in a part of the East African coast just south of the Equatorial Region there, in Madagascar and in the north-west coast of Australia. In a lesser degree it is found also in the coastal regions of the north-west of South America and Central America. The Monsoon lands may be divided, after Stamp, in the following four groups :—

Character-
ization and
Extent.



Tropical and Tropical Monsoon Regions.

Gradation of Rainfall and Vegetation in Tropical Lands.

¹ It is not India does not at all experience winter rain brought by factors other than the Monsoon Winds. Thus during the period between December and March cyclones, originating in the Mediterranean region, travel eastwards across Persia, Beluchistan and Afghanistan, and subsequently reach the plains of the Punjab and Sind, bringing in an appreciable rainfall. Usually they die out before reaching the lower valley of the Ganges. The bulk of snowfall in the north-west and in

Divisions. (a) *Regions with more than 80 inches of rain annually.*—These are the regions of the evergreen forests closely similar to those of the Equatorial Rain Forests. Rice is the chief food crop of these areas.

(b) *Regions with an annual rainfall of anything between 40 and 80 inches.*—These are notably the areas of the Deciduous Monsoon Forests. Here also rice is the main food crop ; but maize, sugarcane and oilseeds are important.

(c) *Regions with an annual rainfall varying between 20 and 40 inches.*—These are usually the areas where thorny thickets and scrub flourish. Millet is the chief food crop in these regions ; but where conditions are favourable wheat and barley are cultivated as winter crops. Sesamum and oilseeds are important, and cotton is another characteristic agricultural product.

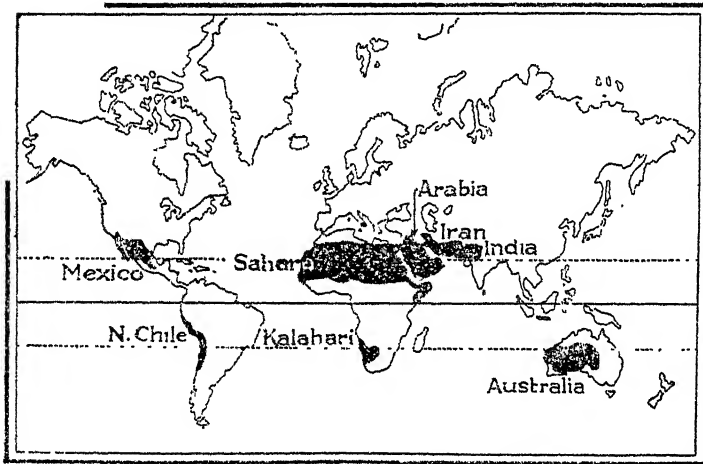
(d) *Areas with less than 20 inches of rain.*—These are the desert and semi-desert regions. In the semi-desert succulent plants are sometimes seen.

Man. The Monsoon lands are amongst the most densely peopled in the world. This is due to a variety of causes, the chief among which are the ease with which jungles can be cleared, the greater facilities for cultivation and the easier and richer conditions of living. Where the soil is the richest the land may be said to be 'saturated' with people as it is in the Gangetic plains of India. Agriculture forms the major occupation of the people.

Extent. 4. **Hot Desert Regions.**—The Hot Deserts are situated on the poleward margin of Tropical lands. They lie within the high pressure belts and on the western side of the continental land masses—the region of 'Dry Trade Winds'. Hence rainbearing winds generally fail to reach them ; on the contrary, currents of air descend on them so as to cause the wind to blow outwards. The eastern

Kashmir may also be traced to these cyclonic disturbances. But this rainfall compared with that caused by the Monsoon is quite small. In certain areas of the Madras Presidency as well as in Ceylon winter rain is caused by the North-East Monsoon. See Stamp, Asia, pp 183-193.

side of the land masses in the same latitudes are not, however, deprived of some rain brought by the 'moist' Trade Winds. The deserts of Mexico and Northern Chile in America, the great Sahara, the Kalahari and the desert of Somaliland in Africa, the plateaus of Arabia, Iran (Persia), Afghanistan, Baluchistan, the north-western parts of India including Sind, the Thar and Rajputana, and the great desert of Western Australia fall within this group. It is interesting to note—and the fact is highly significant



The Hot Deserts of the World.
Note the poleward and equatorward margins.

too—that almost a continuous stretch of desert extends from north-western India to the west coast of Africa,—an area considerably larger than the U. S. A. ; it is broken only by the intervening narrow waters, the total extent of which is quite insignificant in comparison with the vastness of the desert land. The great Sahara has induced many to name the climate as the '*Sahara type*.' The Australian desert covers nearly two-fifths of the continent. These are naturally the regions of maximum heat and aridity. But the most characteristic thing about the climate of these deserts is perhaps the extreme ranges of temperature—both diurnal and seasonal ; the diurnal range at times

Tempera-
ture.

exceeds even 60°F.—a phenomenon found nowhere else. This is so because the dry air as well as the sparseness of vegetation favours rapid heating by day and almost an equally rapid radiation by night. The seasonal range is also characteristically well marked : El Golea in the Sahara has an average temperature of 93°F. in the hottest month (July), but only of 39°F. in the coldest (January)—nearly the same as that of London in January. Jacobabad in north-western India likewise has an average of 98°F. in June, but of 57°F. in January. The annual maximum range is frequently over 100°F., and temperatures of 115°F. are not uncommon. But coastal areas, bathed by air currents, are much cooler : Callao on the west coast of Peru has a mean range of merely 8'5°F., and Swakopmund on the west coast of the Kalahari has 8'4°F. Like cool air currents from the sea the cold currents of the ocean have marked influence in reducing temperature. Another thing to be noted about the Hot Deserts is that many of them are low-lying, and consequently the tempering effects of altitude on temperature are absent. The continental land masses are broader in the Northern Hemisphere : hence the deserts here are larger than in the Southern Hemisphere.

Rainfall.

Rainfall is very insignificant in the deserts, the mean annual rainfall being less than 2 inches. This absence of rainfall makes deserts unproductive. The desert gradually fades into semi-desert towards the Equator where the annual precipitation is 9 or 10 inches ; such a region is really transitional, and may as well be classed with the dry areas of Tropical Grassland. On the poleward margin, on the other hand, a desert gradually loses itself into a Mediterranean scrubland. Areas lying between a desert and a Mediterranean region receive their scanty share of rainfall during the winter. Cairo with an average rainfall of 1'3 inches a year is typical of the transitional areas between a desert and a Mediterranean land.

Vegetation.

It is a popular fallacy to associate deserts with complete absence of vegetation. Actually they are not, as a rule, as completely barren as we habitually think them to be ; on the contrary, many a desert is potentially very

fertile, and desert plants have solved the problem of storing up water by special means. Some species have extremely long roots which penetrate to quite abnormal depths in order to reach water ; others store up water in special stems and leaves. Another point of interest about these plants is that nearly all of them are well protected by means of sharp spines and thorns,—a feature which is supposed to have evolved for preventing the animals from eating them up. These Hot Deserts are generally divided into two groups according to the characteristic vegetation of each :

(a) *Dry Grasslands*,—which intervene between the desert proper and tropical grasslands ;

(b) *Scrublands*,—intervening likewise between the desert proper and the Mediterranean regions.

The *Oases* may loosely be earmarked as another class. These are fertile areas scattered here and there throughout desert regions, and are usually situated in hollows where the underground supply of water reaches the levels immediately below the surface and is, therefore, easily accessible to vegetation. The date palm is typical of these regions. But from the point of view of natural vegetation proper, the oases are not a class apart. An oasis may be a small patch of land with a pool or well, or may be a fairly extensive area.

The deserts, as can easily be imagined, are very sparsely populated ; but an oasis often contains a large ^{Man.} population because, no doubt, of its fertility. The desert people are commonly divided into three groups according to their occupations and habits :

(a) *The Nomads*, who are almost perpetually on the move with their camels and scanty belongings. They are—most of them—robbers, hunters and tenders of flocks and herds, all in one. But they are traders too ; they often act as carriers of goods from one desert region to another, and thus work as middlemen between peoples living in different oases.

(b) *The Settled Peoples*,—who are restricted to the oases, which are of various kinds. They are mainly agriculturists.

(c) *The Miners*, who are another set of the settled population of certain desert regions,—men attracted solely by the prospects of mining. The nitrate fields of Chile, the copper mines and the diamond mines at Kimberley in South Africa, and the gold fields of Western Australia have, thus, experienced great mining rushes ; these 'rushes' are almost entirely independent of climatic conditions. Mining in the tropical deserts is, however, fraught with various difficulties like scarcity of water, lack of timber, shortage of herbage for animals used as beasts of burden, want of transportation facilities, etc. And yet man has actually done his utmost to overcome them.

Desert as
barrier.

Notwithstanding the deep-rooted tendency of the desert peoples to migrate and conquer, the desert as such acts as a formidable barrier to human intercourse. Camel is the only means of transport in a desert. It has a wide foot to prevent its sinking into the sand. It can go without food and water for a long time.

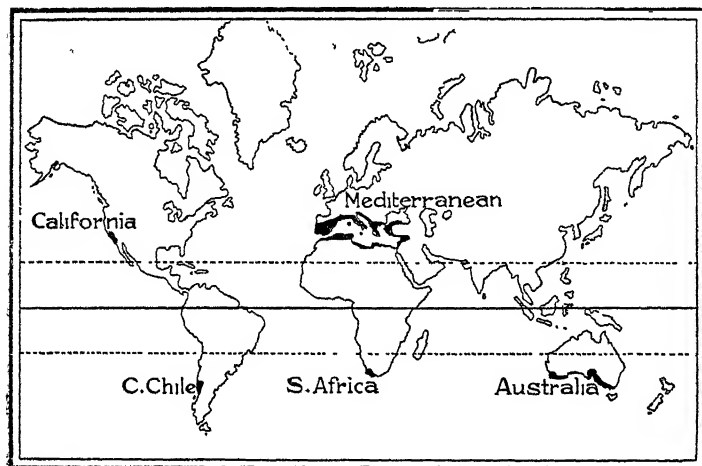
I. THE REGIONS OF MIDDLE LATITUDES

Regions of Middle Latitudes.—The regions of Low Latitudes, we have seen, include a number of natural and climatic areas, of which the Equatorial and the Tropical lands extend almost right round the globe. But as soon as we emerge out of the Tropics we find that the case is no longer so simple ; for a considerable difference between the eastern and the western margins of the continental land masses at once engage our attention. Thus we are led to abandon the method of surveying the world as a whole.

Extent and
character-
istics.

5. The Mediterranean Regions.—The Mediterranean regions lie outside the Tropics and are situated on the western margins of the continental land masses roughly

between the latitudes of 30° and 45° both north and south. They are fringed on the side of the Equator by the Hot



The Mediterranean Regions.

Note that these regions are situated on the Western margins of the continental land masses. Compare them with the regions lying on the eastern side of the continents in the same latitudes.

Deserts, and like the latter are hot and dry in the summer months, because the Trade Winds throughout the season blow off-shore. In winter, however, these regions come under the influence of the Westerlies, because of the shift in the earth's thermal equator, and thus receive moisture. The Mediterranean lands are, therefore, known as the 'winter rain' region.¹ Dry summer and wet winter are the chief characteristics of these regions. Besides the lands surrounding the Mediterranean Sea, (S. Spain, S. France, S. Italy, Greece, Asia minor, and North Africa), California in North America, Central Chile in South America, the south-western parts of the Cape Province in South Africa, and the south-west of Western Australia, South Australia and a part of Victoria (Australia) belong to this group. The position of these regions is also significant: the

¹ It needs hardly to be pointed out that since the Mediterranean Regions lie in both hemispheres, when it is dry in the Northern Hemisphere it is just the reverse in the Southern Hemisphere and vice versa. That explains why we can have typical Mediterranean products throughout the year.

Tempera- ture.	Mediterranean climate cannot prevail except on the western margins of the continents, because the eastern margins receive their rain mainly in summer from the Trade Winds blowing from the oceans ; but the Westerlies blowing from the land are moistureless. Although the Mediterranean Regions are fringed by Hot Deserts on the side of the Equator, and agree in being dry throughout the summer, they lie within the Temperate Zones ; hence despite their bright sunshine they are considerably cooler. But they exhibit also great local diversities. The mean temperature
Rainfall.	in July is over 70°F. in certain areas and over 80°F. in others. Precipitation also shows a corresponding variation, the typical average being between 10 and 40 inches annually ; on exposed uplands the rainfall is often heavier
Vegetation.	than 40". The vegetation is also characteristic. Since the plants must protect themselves from lack of moisture during the summer months by utilizing the water which accumulates underground after the winter showers, shallow rooted species, requiring light rains in the spring and early summer, do not, as a rule, flourish. Trees and shrubs capable of retaining moisture for utilization in the dry season do, therefore, prevail, and the Mediterranean Regions are, thus, clothed naturally by evergreen trees and shrubs. Most of these have developed special devices for holding moisture. The olive has leaves provided with fine silky hairs to prevent excessive evaporation ; the vine has developed enormously long roots ; a few other species of trees have leaves with a coating of wax to prevent rapid transpiration. Typical ground vegetation of the Mediterranean lands are the various species of flowering shrubs and herbs which generally take the place of grasses. Where the supply of moisture is sufficiently abundant, fine forests grow, and the chestnut and the cork oak trees occur in large numbers. The fairly long dry summer with bright sunshine for the greater part of each period of twenty-four hours is said to be ideal for the ripening of fruits, and the Mediterranean Regions are commonly very suitable for the production of
Products.	a variety of them : thus oranges, lemons and the grape-fruit among the citrus variety are abundant ; peach, pear,

apple, apricot and nectarine belonging to the deciduous type are also equally plentiful ; the olive, almond, fig, mulberry and vine are by no means less important. Of grains certain types of wheat and barley are important. Irrigation has played a large part in the commercial history of these regions, because rainfall is not generally sufficient for the raising of as much crop and fruits as is deemed essential by the modern man for economic and commercial purposes. The Mediterranean lands of Europe were the cradles of the civilisations of Greece, Rome, Crete and Carthage. Cradle of civilization

6. **The Temperate Desert Regions.**—These occupy enormous tracts of land in the interior of Asia, Europe, and North America, as well as in the Patagonian Desert region of South America, and are situated, generally speaking, within the belts where high atmospheric pressure is formed in winter and low pressure is generated in summer. These regions are flanked, especially in the Northern Hemisphere, by lofty mountain barriers which cut them off from oceanic influences. Their distance from the great oceans of the world is, as a rule, sufficiently vast to prevent marine influence from entering them. High ranges of temperature and low rainfall generally characterize these desert regions. Rainfall occurs commonly in the summer, except in regions bordering on the Mediterranean lands which of course, receive winter rain. The enormous stretch of land falling within this division naturally possesses a marked variety of topographical feature ; and since topography has great influence on climate, these regions may be easily subdivided into various types, of which the chief ones have thus been described :

(a) *The Iran Type*,—which really forms a transition between regions enjoying a Mediterranean climate on the one hand and the Hot Desert climate on the other. In winter it is intensely cold ; the mean January temperature is only slightly above the freezing-point ; at night sharp frosts occur, and the temperature often sinks below the freezing-point. In summer the sky is generally brightly

clear, the atmosphere dry, and sunshine almost unbearable. The average July temperature in Tehran is 85°F., sometimes even 110°F. Precipitation is almost wholly restricted to the winter months; the annual average rarely exceeds 13 or 14 inches, especially on the plateau region. Often there is a snowfall instead of rain. This type of climate occurs in a few other places, as well, notably in the Salt Lake areas of North America.

(b) *The Tibet Type*,—found on the highest plateaus. The climate is terribly severe; violent winds blow during the great part of the year. The most characteristic feature of the climate is the enormous difference between the sun and shade temperatures: rocks in the sun are often hot to the touch, while in the shade it may be quite freezing. This is mainly due to the exceptional rarity of the atmosphere. Precipitation is extremely small, and keen frosts are common in autumn and winter. Gynagtse which is not very far from Sikkim and Darjeeling has an annual rainfall of only about 8 inches; Lhasa farther north has something like 18 or 20 inches. The precisely Tibetan type of Climate, it should be noted, does not prevail all over Tibet, it being restricted, in the main, to the highest plateaus—regions 11,000 feet above sea-level. Besides the high plateaus of Central Asia, this type occurs in the Bolivian plateaus of South America at and over similar heights.

(c) *The Gobi or Mongolian Type*,—which, as the name suggests, is the characteristic climate of the Gobi or Shamo desert occupying roughly the central parts of Mongolia. It is the climate pre-eminently of “lower elevations farther away from the equator,”—a climate characterized by very short summers and long chilly winters. The average winter temperature sinks often to 40°F., below the freezing-point and sometimes even to 50°F., below zero. The higher peaks of mountains, such as the Altai, remain covered up by snow, except for a few weeks in summer which starts very late and passes away almost as soon as it starts. Rainfall is practically nil, and even in the immediate vicinities “it is frequently concentrated in six weeks of the summer half

year. Sometimes there is absolute dryness until the end of June" in the more fortunate regions around.¹ Besides the this group.

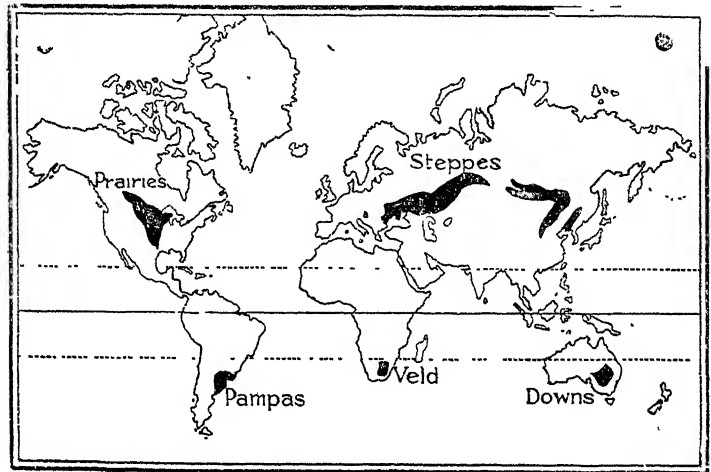
(d) *The Turkestan Type*,—occurring mainly on the low-lands of South-West Siberia. The summers are very hot, the usual July temperature being over 80° F. ; but the winters are cold for the latitude, the mean temperature in January usually dropping below zero. Precipitation ranges from about 3 or 4 inches to about 6, and a progressive variation is marked towards the east till in the hills it comes up to about 14 inches or more as the figures obtained at Samarqand and Tashkent show. The maximum rainfall is commonly witnessed in the spring. The predominance of winds is a noteworthy feature of the climate ; except in the mountain valleys where strong local winds prevail, the whole area is almost swept over by northerly, north-easterly, and north-westerly winds. It is not exactly a desert type of climate, but one of a very dry steppeland.

These Temperate Desert Regions, like the Hot Deserts, have been aptly described as 'regions of lasting difficulty'. The soil in these regions is not always barren but crop production is difficult due to unfavourable climatic conditions. Extreme range of temperature, dry and destructive winds and uncertain rainfall prevent cultivation. These regions are, therefore, sparsely populated. Greater part of the land is used for grazing. Where conditions are suitable or have been made to suit the requirements of man, as in the arid regions of North America, animal husbandry has been started. As in certain parts of the Hot Deserts, so in these Temperate Deserts irrigation sometimes makes the raising of crops possible. So even in these regions people have performed wonders by irrigating the soil in various ways ; the water supply is derived from the adjacent highlands. Wheat, maize, melons and fodder for sheep and cattle are fairly largely grown in the irrigated areas. In the

Man in
Temperate
Deserts.

¹ Case & Bergsmark, College Geography, pp 459-60.

irrigated parts of arid South America both vine and sugar-cane are important.



Mid-latitude Grasslands

Note their position in relation to that of the Temperate Deserts.

Extent.

Temperature.

7. Mid-latitude Grassland Regions.—This kind of grassland is found in the mid-latitude interior of North America and Eurasia mainly. The Prairies of North America and the steppes of Southern Europe and Southern Siberia are the outstanding examples. In the Southern hemisphere where the land mass is narrower, we find similar grasslands but they exhibit certain well-marked differences, owing chiefly to their nearness to the seas. The Pampas of South America, the Veld of South Africa and the Downs of Australia belong to this group. The climate is one of extremes of temperature and low rainfall, chiefly, due to their inland situation. The summers are exceedingly hot ; no cooling breezes from the sea penetrate them. Consequently the average summer temperature rises over 60°F., often it is above 70°F., and sometimes even higher. But the summer is usually short, rarely exceeding three months in the year. Winters are long and difficult ; neither warm Westerly Winds nor warm ocean currents are there to counteract their severity. The

average winter temperature falls below zero. This extreme continental type of climate does not, however, occur in the Southern Hemisphere because of the narrower land masses. Rainfall comes mainly in the spring and summer, because as the land gradually begins to be heated in spring, low-pressure centres are formed, and winds begin to rush in from the ocean, laden with moisture, causing a moderate rainfall. Since various local factors govern the actual amount of rainfall in each region, it is difficult to give exact figures that would hold good for all the regions. In typical regions precipitation varies between 10 and 30 inches. In the cold regions of the N. Hemisphere the rainfall in winter takes the form of snow. The natural vegetation is grass. The light spring showers are ideal for the growth of grasses. These Temperate Grasslands, are, as a rule, treeless, because the characteristic light rain is not suitable to trees. The grass is usually softer and less coarse than that of the Tropical Grasslands. The typical grasslands of the world are the Prairies of North America and the steppes of Eurasia. In the Southern hemisphere the Pampas of Argentina, the Veld of South Africa and the downs of the Murray-Darling basin of South Australia are the outstanding examples of grasslands of this kind.

The animals, as in the latter, are of two kinds—swift-footed grass-eating animals, represented by the antelope, the horse, the bactrian (two-humped) camel, the bison, the kangaroo, etc., and the carnivorous such as the wolf, the coyote, wild dogs, etc., “amongst which man must really be classed.”¹

The mid-latitude grasslands have been chiefly devoted to grazing, and in most parts of these regions live-stock and their by-products constitute the main source of wealth. Of all domesticated animals the sheep is the most important, because having been provided with cleft lips and covered by bushy fleeces they can live on short grasses so as to survive periods of drought and withstand the long and severe winters better than cattle. Thus the Pampas, the

¹ Chisholm's Handbook of Commercial Geography, p. 41.

Cattle
rearing

Agricul-
ture.

Veld, the Downs, the European Steppes (as well as some other places not falling within this group of regions) contain large numbers of sheep. The Canadian and Russian Prairies are not, however, suitable for quite successful sheep-rearing. The Steppes of Asia as well as of some adjacent areas contain large number of sheep, but the figures are relatively small per square mile. Cattle are also important, particularly in the Argentine and Uruguay, though far less distributed than sheep. Their number is also smaller than in the humid parts of the Middle Latitudes. In the grasslands they are distributed mainly in the wetter regions, because it is difficult for them to subsist on short and hard-fibred grasses. Although the Temperate Grasslands, particularly of the Southern Hemisphere, are still primarily sheep-rearing areas, agriculture is fast increasing in importance. Many of these regions are well irrigated, and are under crops ; excepting the dry grasslands of Mongolia and Manchuria all these regions—Prairies, the Pampas, the Veld, the Downs—are now fairly well developed ; the chief crop is wheat, except in South Africa where maize is of prime importance ; barley, oats and rye are also important. Thus “the Temperate Grasslands have become the world’s granaries, from which the deficiencies of the industrial countries are made up”¹ With this development of crop production has also come a revolution in the meat industry of these regions, because the huge ranches are steadily being broken up in order to make room for wheat farming.²

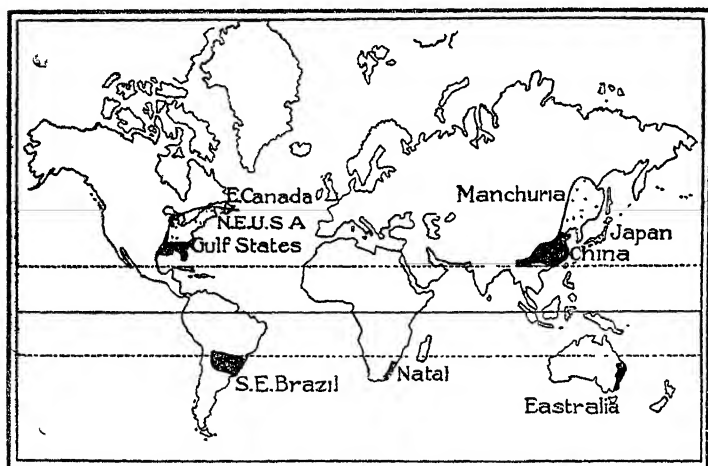
Extent

8. **Mid-latitude East Coast Margins.**—The lands of the Mid-latitude East Coast Margins lie in the same latitudes generally as the regions having a Mediterranean type of Climate, but on the eastern side of the continents. These bear certain similarities in temperature to the temperature to the Mediterranean regions, but an important point of difference is that the rainfall in these eastern lands comes mainly in summer. The climate is often called Warm Temperate and the lands Warm Temperate Regions. The

¹ Stamp, *A Commercial Geography*, p. 29.

² *Ibid.*

Gulf States of the U. S. A., South-Eastern Brazil, Natal in Africa, the eastern half of China, and the southern parts of the East-Australian coasts are typical of these regions ; whereas the north-eastern parts of the U. S. A., parts of eastern coastlands of Canada, Manchuria and Japan belong to different sub-types of the main group. And yet there are considerable regional variations even in the typical lands. These Mid-latitude East Coast Margins have been thus divided by Stamp.¹



Lands of the Mid-latitude East Coast Margins.

(a) *The South-Eastern States of the U. S. A.*—These are the celebrated cotton-lands of the States, and have a moderate rainfall all the year, though the summer months experience a maximum because of the low-pressure centres formed by the heat in the heart of the continent.

(b) *Northern and Central China*,—which really fall within the great Monsoon region of Asia as does India. But there is so marked a difference in climate as to merit a separate name—the China type of Climate.² The rainfall,

¹ Stamp, *A Commercial Geography*, pp 29-32

² Southern China comes under the Tropical Monsoon Climate like India and Indo-China. See Stamp, *Asia*, p. 27.

of course, is due to the formation of low-pressure centres which attract moisture-laden winds from the ocean as it is the case in India and other Monsoon lands. And it is summer rain, too. But the winter is terribly severe in Northern and Central China, because of the dry winds blowing from the heart of Asia. Snow is quite common in winter even on the plains. In Northern China even the greatest rivers often become frozen in winter. Some amount of winter rain also occurs, particularly in the coastal areas. This China type of Climate may, again, be divided into three sub-types :—

- (i) Northern China type, represented by the climatic conditions of Peking ;
- (ii) Central China type, represented by the conditions prevailing in Shanghai and Hankow ;
- (iii) Japan type, which is mainly due to the insular position of Japan, typified by the climatological figures obtained at Tokyo.

The principal grains of Northern and Central China are wheat and millet while rice is the all important food crop of the south. Cotton is a leading crop in Central China.

(c) *The South-Eastern Coastlands of Australia*,—the climate of which has received a new name—the Eastralian type of Climate. The rainfall occurs all the year round with, of course, a summer maximum, which is due chiefly to the Trade Winds. In winter some influence of the Westerlies is also felt. It differs from the China type of Climate chiefly in two particulars,—the winter is much milder, and the rainfall is not monsoonal. The normal vegetation is the eucalypt forest.

(d) *The Natal region of South Africa*,—where the climatic conditions are somewhat similar to those of the seaboard of New South Wales in Australia (south-eastern coastlands). Rainfall is light, but occurs intermittently at all seasons, with a maximum in summer. It is caused by the Trade Winds. The coast is kept warm in winter by warm currents. Warm Temperate forests occur.

(e) *The region of Uruguay and South-Eastern Brazil*,—where, again, the climatic conditions are somewhat similar to those of the south-eastern coastlands of Australia, but more particularly perhaps to those of the Natal region of South Africa. Rainfall is fairly good, and occurs mainly in summer, due to the Trade Winds. There is an warm ocean current along the east coast, keeping it warmer than the west cost. Warm Temperate Forests occur here also. Thus the climatic conditions of the Mid-latitude East Coast Margins in the Southern Hemisphere are, on the whole, similar.

It will be clear from a general survey of these regions that the natural vegetation, despite all local variations, is everywhere characterized by the presence of tall trees ; and where rainfall is well distributed evergreen forests also occur. These evergreen forests have been described as "Warm Temperate Rain Forests," and are said to rival the Equatorial Forests. Palms and tree ferns are characteristic of many of these forests. The outstanding feature in the Gulf States of North America is the presence of both broad-leaved and coniferous forests, and pitch pine is obtained from the latter. The Mid-latitude East Coast Margins are said to be eminently suited to human occupation and development.¹ Thus Central China is almost saturated with people, and is one of the most densely inhabited agricultural lands of the world with a density of 3,000 or more per square mile. Rice, cotton, tea and silk are the principal products. The Gulf States of the U. S. A., have been aptly described as 'the world's storehouse of cotton' ; and the famous Maize Belt of North America lies immediately to the north. The sea-board of Eastern Australia as well as the coastal region of Natal in Africa has witnessed the migration of large number of people in recent years. In the heart of South America, however, large tracts of these forest lands yet remain to be penetrated because mainly of their swampy and unhealthy character.

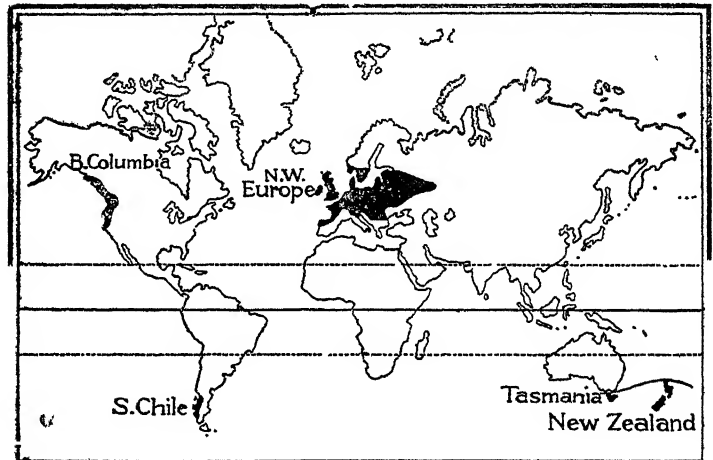
General
character
of Vegetation.

¹ Chisholm's Handbook of Commercial Geography, p. 43.

III. THE REGIONS OF HIGH LATITUDES

Location

9. **The Deciduous Forest Reginos.**—These occur mainly on the western margins of the continental land masses like the Mediterranean lands, but on the poleward side of the latter. For this reason these areas are known as the 'West European' type of natural region. The climate is also referred to as the "West Marginal type of Climate."



Deciduous Forest Regions.

Tempera-
ture and
Rainfall.

Another significant fact about the location of these regions is their situation within the Westerly Wind Belt. As the lands surrounding the Mediterranean Sea constitute the largest and most typical of the Mediterranean regions of the world, so the largest area belonging to the Deciduous Forest group is North-Western Europe. The north-western coastlands including British Columbia form such a region in North America. In the Southern Hemisphere a small tract in southern Chile, and the islands of Tasmania and New Zealand in Australasia belong to this group. Since the regions lie in the poleward sections of the Temperate Zones, and are in the closest possible proximity to the oceans the climate prevailing in them is often called 'The Cool Temperate Oceanic Climate.' Since these regions lie in the belt of the Westerlies, rainfall throughout the year

and small seasonal range of temperature are the chief characteristics of the climate. But rain throughout the year does not mean that these Deciduous Forest regions are comparable with the Equatorial Regions. The Westerlies are extremely variable and by no means as steady as the Trade Winds. Hence cyclones and anti-cyclones are a distinguishing feature of the weather. These are par excellence the oceanic or marine lands of the world. In Europe, this marine type of climate reaches far to the north, mainly because of the drift of warm waters—a continuation of the famous Gulf Stream—which is not retarded by land barriers. Thus the shores of the British Isles and North-Western Europe are kept warm and free from ice even in winter. Eastwards, however, the winters are, in the main, progressively colder and summers correspondingly warmer, because of the relative distance of the regions from the sea. That is why geographers frequently distinguish two sub-types of this climate in Europe : Divisions.

(a) *The North-West European Type*,—characterized by conditions almost typical of the Cool Temperate Oceanic Climate. Summers are cool, winters mild, and rainfall fairly abundant all the year. The average temperature of January is above the freezing-point, making an average of about 40°F. for whole year. The whole of the British Isles, Northern Spain, roughly the Western half of France, Belgium, Holland, most of Denmark, and the narrow western fringe of Norway come under this sub-division. But conditions in Denmark and the Norwegian fringe referred to are slightly different because of their more northerly location. Denmark, though not farther north actually than the British Isles, is farther east, and less fortunate, therefore, to benefit from the warm North Atlantic Drift which flows along the west coasts of the British Isles towards the North Pole.

(b) *The Central European Type*,—with a January temperature about or below the freezing point. Winters are colder, summers warmer, and rainfall, generally speaking, comparatively light. Thus while some parts of the British Isles, particularly on the west, have a rainfall

of over 80", it is as low as 18" in Eastern Germany. Roughly the eastern half of France, Switzerland, Germany, some parts of Northern Italy, practically the whole of the Balkans, the southern parts of Norway and Sweden etc., fall within this sub-group.

The northern parts of the North American west coast get a good rainfall all the year round from the South-West Anti-Trades (South-Westerlies). It is 80" in the wetter parts, but progressively less eastwards. The warm North Pacific Drift keeps the west coast warm in winter, and when in summer New York on the east is nearly as hot as Bombay, the west coast is kept cool by the influence of the sea. Southern Chile similarly receives its moisture from the N. W. Anti-Trades (North-Westerlies) all the year round, and is kept cool by the cold Peruvian and the Antarctic Currents. Tasmania and New Zealand also fall within the Westerly Wind Belt ; only the extreme northern end of New Zealand, lying in the same latitude as Spain, has a climate somewhat comparable with that of the Mediterranean lands. Rainfall, of course, varies from a maximum of well over 40" in the western parts to about 20" in the east. The maximum in Tasmania is usually over 40", while that of New Zealand is over 70". The climate is oceanic and hence equable.

Vegetation. The natural vegetation of these Cool Temperate regions, like that of the Monsoon lands, is said to be the Deciduous Forest. But the Deciduous Forests of the two climatic regions differ ; in the Monsoon lands trees shed their leaves in the hot season as a means of protection against the drought ; in the Cool Temperate Regions this resting period comes in the cold season for protection against the oncoming frosts. These Temperate Deciduous Forests generally provide good timbers of the hardwood variety ; the timber is, of course, softer and much more easily worked than that of the Equatorial forests. The oak, elm, maple, beech and birch are the typical varieties.

The Cool Temperate climate is said to be the most conducive to human progress, because it is cold enough to

induce man to take to manual work for maintaining bodily warmth in winter, nor are the summers so hot as to render outdoor work unpleasant and troublesome. Most of the great industrial countries of the world—Britain, France, Germany, Belgium and Czechoslovakia—are located in this region.¹ We are also told that the marine regions have the most invigorating type of climate ; and so far as human energy is concerned, North-West Europe, Western U.S.A., and Canada rank the highest. These West marginal lands in the cool temperate zone are known as “regions of effort” as here man is rewarded in proportion to the effort made by him. Most of the areas formerly covered by Cool Temperate Forests, particularly in Europe, are now under temperate cereals like wheat, barley, oats and rye ; in the warmer parts we find maize. Fruits are also abundant, and include apples and pears. The Cool Temperate Regions of North America are also said to be equally suited for similar development ; but considerable areas of British Columbia are too mountainous for settlement, and the deep valleys separating the mountain ranges are often very thirsty, precipitation in certain areas mounting no higher than 5" a year. New Zealand is also being rapidly developed. Southern Chile, however, still remains quite undeveloped, because rainfall is too much and the region is too mountainous to be developed with profit and ease.²

10. High Latitude East Coast Margins.—These regions are confined to the Northern Hemisphere, because the land masses of the Southern Hemisphere are too narrow for the development of the climatic conditions peculiar to the East Coast Margins of the High Latitudes. These regions are located generally in the same latitudes as the Deciduous Forest Regions, but are on the eastern side of the continental land masses. The north-eastern parts of the U.S.A., the Maritime Provinces and the St. Lawrence Valley of Canada comprise this group in North America. In Asia the group is comprised by Manchuria, Amuria,—and probably by those parts of North China which border

¹ Chisholm's Handbook of Commercial Geography, p. 45.

² Chisholm's Handbook of Commercial Geography, p. 45.

General
character.

on them. Though these regions occur in the same latitudes as the Deciduous Forest Regions, these east coasts are not located in the Westerly Wind Belt ; so despite the moderating influence of the ocean, which, no doubt, greatly modifies the extremes of heat and cold, these are regions of far lower temperature in winter than are the corresponding areas on the western margins of the northern continents—the Deciduous Forest Regions. Summers are, again hotter. The two regions may best be considered separately :

Tempera-
ture,
rainfall
and
products.

(a) *The Laurentian Type of Climate*,—is found around the mouth of the St. Lawrence in North America, but may be held to extend farther so as to include North-Eastern U.S.A., the Maritime Provinces and the St. Lawrence Valley of Canada. Rainfall occurs all the year round because mainly of the N. E. Trades, and is well distributed. The natural vegetation is woodland or forest consisting of a mixture of deciduous and coniferous trees. Oats, wheat, barley and rye, as well as much potato, are grown, and the people practise mixed farming as in England. The New England States occupying the extreme north-east of the U.S.A., still comprise a similar region of mixed farming. The climate is extremely cold in winter because of the cold Labrador Current. The St. Lawrence becomes ice-bound for three or four months of the year, and the ports of Montreal and Quebec cannot be used in winter. The ports of St. John and Halifax, on the Atlantic seaboard, however, remain open all the year.

Tempera-
ture and
Rainfall.

(b) *The Manchurian Type of Climate*,—is often regarded as a sub-type of the China Type. It shows much similarities to the Laurentian type of climate. But the rainfall in these regions occurs in summer and is monsoonal in character. The range of temperature between summer and winter is also more extreme than the Laurentian type. Dairen on the shores of the Yellow Sea has an average January temperature of 24°F., while the temperature rises up to an average of 76°F. in July or August. Harbin farther north has a January average of about zero and a July average of about 72°F. Rainfall, being monsoonal, is

restricted to the summer ; but the total rainfall is much less than it is in Japan. Moukden has an annual average of 26.1" and Harbin of 18.7". Like Montreal and Quebec of Canada the port of Vladivostok remains ice-bound in winter. The climate, though severe, is healthy, and suited particularly to cereal farming. Valuable forests grow ; the most important of the timbers is the Manchurian pine ; spruce, silver fir, red pine, larch and oak are also obtained in large numbers. As yet forestry has not advanced up to normal expectations. Manchuria is said to be one of the most favoured agricultural spots in the Far East. The chief crops are soya beans, kaoliang, millet, maize, wheat and rice ; of these the soya bean is the typical crop, occupying, as it does, nearly a quarter of the total area under cultivation. It has well been described as a "Land of Opportunities."¹

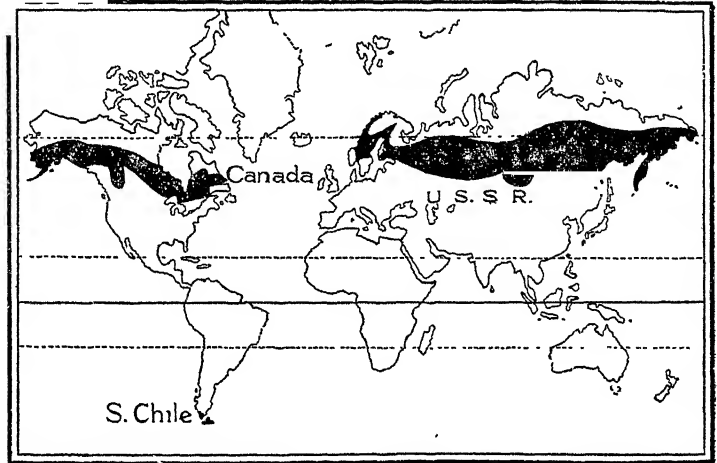
11. The Coniferous Forest Regions.—Located northward beyond the Deciduous Forests and the High Latitude East Coast Margins are the vast Coniferous Forest Regions of the world. They form almost a continuous sub-Arctic belt from the north-western confines of Europe to the north-eastern shores of America, broken only in the midway by the narrow Behring Strait. In America this belt includes the forested interiors of Alaska and Canada nearly as far south as the St. Lawrence river. In Eurasia this belt of conifers embraces the forested areas of Norway, Sweden, Finland, North and Central Russia, and Siberia. In various places it penetrates beyond the Arctic Circle. The extent of similar forest regions in the Southern Hemisphere is unimportant and negligible. Only the extreme south of South America and the mountains of New Zealand have a climate comparable with that of the coniferous forests of the north. Thousands upon thousands of square miles of these forest regions remain as yet practically unexplored and unmapped. The average temperature in most places is low, with an annual average

Location
and
Extent.

Temperature.

¹ See Manchuria, Land of Opportunities, published by the South Manchuria Railway Co (New York 1922), and the Report on Progress in Manchuria, 1907-28, published by the same company at Dairen, 1929.

of less than 40°F . The seasonal range in places near the ocean is comparatively small ; but in the heart of the



The Coniferous Forest Regions.

forest region the climate is of the Continental sub-Arctic type—often called the Cold Temperate Climate, which, like all other types of the Continental Climate, is characterized by an extreme seasonal range. Midsummer temperatures of 80°F ., are common, and in many places reading of 90°F ., or over have been obtained. In some places a seasonal range of over 100°F ., has actually been recorded,—the greatest range in the world. Thus, in the town of Dawson on the Yukon temperatures of 95°F ., and 68°F ., have been registered. A drop of 40° within 24 hours is not also uncommon. The Cold Pole of the earth, as far as our present knowledge goes, really belongs to this region ; at Verkhoyansk in Siberia a temperature of -93.6°F ., has been registered ; this is said to be 20° or 30° lower than the estimated minimum at the North Pole.¹ Winters are very long,—nowhere less than of seven months' duration ; and summers correspondingly short, being confined to a period

¹ But probably the continent of Antarctica has the lowest temperatures ; there temperature as low as -24°F . in mid-summer and -75°F . in late spring have been recorded. See Ronald Amundsen, *The South Pole* (1929).

of three months where they are the longest, and connected by a month of spring and another of autumn. Winter generally commences in September,—on the poleward margins even earlier,—accompanied by severe frosts and a rapid fall of temperature. Along the Yukon in Canada and Alaska, as well as along the Amur in Siberia, sharp frosts occur before the third week of August has elapsed. Snow-storms are common. Thus before the month of November slips away, the forests are covered with the first layer of snow. It is in April that the snow generally begins to disappear ; but the growth of vegetation does not commence till May ; yet as late as June snow is frequently seen on the wooded northern slopes in North Russia. With the extreme range of temperature there is a corresponding seasonal range in the length of day and night. During the winter nights are long and days correspondingly short. Precipitation is small, varying generally from 7 to 15 inches annually, and but for the low rate of evaporation most of these forest regions would be semi-desert. A little less than half the total annual precipitation comes as rain during the three summer months of June, July and August : the greater part of the precipitation comes in the form of snow ; this snowfall, occurs mainly in the cold season. There is a progressive decrease of both summer rainfall and winter snow from south to north. The rivers of these regions in the Northern Hemisphere flow in a general northerly direction towards the Arctic Ocean because of the general slope of the land in that direction, and remain icebound throughout the winter. In the spring the upper courses in the warm south melt, while towards the Arctic Ocean it is still winter, with the results that flood waters spread far and wide so as to turn the coniferous forests into a vast forested morass. The land surface of these regions reflect the effects of glaciation ; continental glaciers moving southwards have scraped off the soil and carved out many a glacial lake basin. Thousands of lakes, as well as swampy lands, are seen in Northern Canada, Sweden, Finland and Siberia. Finland, it is interesting to know, is said to have more than 50,000 lakes of various size, and 12 per cent of her total area is said to be covered by inland

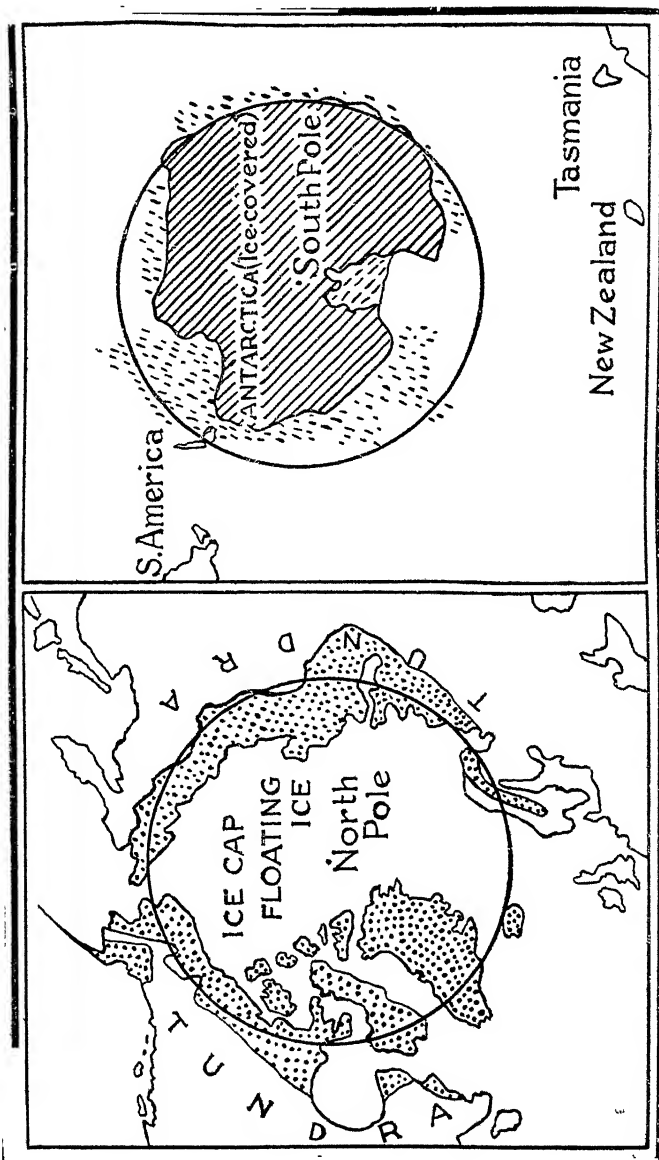
- Vegetation.** waters.¹ The natural vegetation everywhere is the ever-green Coniferous Forest or Taiga—"the world's great storehouse of soft-wood timber, such as pine, fir, and deal."² The thick-skinned resinous leaves of these trees are said to be a protection against both cold and unusual loss of moisture. The finest trees are found in the warmer southern parts ; farther south the forests pass into mixed hardwood and softwood forests—deciduous and coniferous trees ; polewards they pass into the stunted trees peculiar to the Tundra region. The great Coniferous Forest Belt of North America is the most important in the world ; the Scandinavian and Russian forests of Europe are less extensive ; the timber of the vast Siberian forests is often of a poor quality because of their swampy conditions.
- Animal.** The animals of these regions are protected from the cold by thick and multi-coloured fur ; the silver fox, the patch fox, the chinchilla rabbit, the mink, and a host of other furred animals were abundant in the past. In the modern world furs are highly prized, especially by women, because of their beauty, style, costliness and warmth. The main fur-producing regions are round the Hudson Bay in Canada and the forest regions of Siberia. Another
- Fur trade.** important industry in these regions is, of course, the soft-wood industry. The timber is required for a variety of uses like building, fuel, mine props, etc., but the production of wood-pulp for paper is rapidly outweighing all. The trees are felled in the winter, and are dragged over the snow to the rivers, whence they are carried to the saw-mills when the snow melts. Many of the soft-wood forests of the world have been depleted ; large reserves now exist only in Canada and Russia. These forest regions are generally good sources of water power. The land surface, being dotted about with innumerable glacial lakes, provides natural catchments and storage basins for the rivers, most of which run along the slopes in a series of rapids and falls. These conditions make possible the construction of hydro-electric plants, and with them the growth of manufacture.
- Soft wood industry.**
- Power and Manu-
facturing.**

¹ Case & Bergsmark, *College Geography*, p. 474.

² Chisholm's *Handbook of Commercial Geography*, p. 46.

Another factor contributing to the growth of industries is the abundance of raw materials—especially wood and minerals. Northern Canada has valuable deposits of gold, silver, copper, nickel, zinc, cobalt and asbestos. Northern Scandinavia is celebrated for high-grade iron ore, some of which contain as much as 60 per cent. pure iron. The extreme shortness of summer conditions in these regions is insufficient for the ripening of cereals ; nor is the glaciated soil fertile enough for crop production. But since the loss of moisture is small the production of some of the hardier crops is possible in certain areas. Thus some oats and barley are grown in specially favoured spots ; but agriculture in these regions will always remain a minor industry.

12. The Tundra or Cold Desert Regions.—These are located roughly within the Arctic and the Antarctic Circles. The curvature of the earth in the two polar regions is, however, not similar. The North Pole is pretty closely surrounded by land, while the South Pole is located within a small continental landmass thickly covered with ice. Within the Arctic Circle is located the cold Arctic Ocean, within the Antarctic Circle the ice-covered continent of Antarctica surrounded on all sides by vast stretches of water and ice. Nearly the whole of Greenland and the adjacent islands, as well as the northern fringes of Canada, Alaska, Scandinavia and Siberia enter into the Arctic Circle, and thus constitute the Tundra or Cold Desert Regions of the Northern Hemisphere. The continent of Antarctica falls almost entirely within the Antarctic Circle. In these high latitudes the winters are naturally very long and summers correspondingly short. The sun never sets for some months during the summer and never rises in winter. But even in midsummer the sun never rises far above the horizon although the effects of its low altitude are somewhat balanced by its continuous presence for months on end. Such pronounced seasonal conditions naturally result in a corresponding range of temperature. The summers are warm for the latitude except on snow fields and high lands ; winters are cold everywhere. And



Tundra and Cold Desert Regions.

although the records obtained as yet show that the 'cold pole' of the earth (Verkhoyansk) does not fall within the Arctic region, there is good reason to believe that the winter temperatures of Antarctica are lower still. There is, however, considerable variation of temperature in these regions. Thus in the Arctic areas of North America the lowest temperature yet recorded is—68°F.; in regions near the sea it is not so cold, the lowest figure obtained in the northern coast of Canada and Alaska is—54°F. in mid-winter. The Arctic regions of east central Siberia are, however, colder ; but the coastal regions of Norway in the same latitude are 40° to 60° warmer than the east central regions of Siberia, owing, no doubt, to the warm winds and ocean currents from the Atlantic. Though the sun is never very high above the horizon, in summer, it shines for many days together, with the result that the land has scarcely any time to radiate the accumulating heat in course of the exceedingly short nights. The atmosphere consequently is extremely hot for the latitude : a temperature of 90°F. is not uncommon in the lower Tundra, and in some places a shade temperature of even 100°F., has been recorded. Precipitation, as in the Hot and Temperate Deserts, is almost non-existent except for occasional snow-falls which at times assume the proportion of snow storms. The Polar Regions are too cold for forests. The natural vegetation Vegetation. in the Arctic Tundras is moss and lichen, with small bushes and stunted trees near about the Coniferous Forest Belts. Grass and herbs are also not rare. But the soil, as well as the climate, is almost totally unfit for the raising of crops. The richness of summer vegetation, too, has little economic value. The most notable animals of this Tundra Region Animal Life. are the musk ox and the caribou or reindeer. Hares and lemmings are also important. Among the carnivores the celebrated polar bear reigns supreme despite his numerical weakness ; wolves and foxes are found in larger numbers. The seal, the walrus, the whale, as well as several kinds of fish and birds, are found in the adjoining seas and the coastal lands of both the polar regions. Life in the polar regions, it needs no mention, is as hard as it can be. And

Man.

yet man has braved the hardships as well as the dangers. The Eskimos, the Lapps, the Samoyedes, the Yakuts, are the actual inhabitants of the Arctic regions. But the population is naturally very small. The chief occupations of the people are hunting, fishing, and tending the reindeer. The white man has introduced mining and reindeer farming in some places, especially in Alaska. The Government of the U.S.A., have done much for the development of the Arctic region of Alaska, and the Second Five Year Plan (1933-37) of the U.S.S.R., has also done much to develop the possibilities of the Siberian Tundra. It seems not unlikely, therefore, that these regions have fairly good possibilities in the future. Yet they must remain relatively undeveloped for an indefinite period hence, if not for all time to come.

QUESTIONS

1. Define a natural region and give an illustration with a description of an area that may be so described

2. What do you mean by a 'natural region'? Into how many natural regions can the world be divided? Name them and indicate their position in a map.

3. Describe the climatic regions with special reference to the animal and plant life to be found in each of them.

4. What do you mean by a Mediterranean type of climate, and in what parts of the world other than the Mediterranean region this climate is found?

5. Account for the Mediterranean type of climate, and compare it with the monsoonal type. Also give the chief products in each of them.

6. What are the chief conditions which determine the position of deserts both cold and hot? Do you know any desert of commercial value?

7. Explain the following phenomena:

(i) In the Mediterranean region most of the rain falls in winter months.

(ii) Civilised man is found mostly in the lowland regions of the Temperate Zone.

8. Give a general description of the climatic conditions and their relation to the economic development in those areas of the world characterised by the West Marginal type of climate.

9. Give an account of the conditions of climate and vegetation in areas having the St. Lawrence type of climate. Show the influence of these on human development.

10. What do you understand by the Monsoonal type of climate? Describe its characteristic products.

11. Describe the distribution and economic uses of coniferous forests of the world

12. Name the different types of grasslands in the world. Give a brief account of their economic development.

13. What do you mean by the "Monsoons"? In what parts of the world do you find them. Name the chief products found in the Monsoon regions.

CHAPTER IV

COMMODITIES OF VEGETABLE AND ANIMAL ORIGIN

Agriculture including stock-raising is the most important primary occupation of man. Cultivators of the land and breeders of stock use the reproductive powers of plants and animals to increase their stock and produce. The distribution of agricultural products over the surface of the earth is mainly determined by the nature of the climate and character of the soil. The climatic factors specially humidity and temperature are the most important but the importance of soil cannot be overlooked.

Soil is chiefly ground-up rock containing sometimes as much as 95 per cent. minerals besides some organic matters derived from the decay of plant and animal life. There are no soils that do not contain some plant food. Absolute infertility in a soil is rare. Like climate soil may also be classified into a number of types. Soils differ from one another in two particulars—*mechanical* or *physical properties* and *chemical constituents*. Physically they differ in *texture* or the condition of their particles. On the basis of *texture* they may be classified as sands, silts and clay. *Sandy soil* contains more than 60 per cent. of sand and 10 per cent. of clay. They are easily worked but water drains away quickly. *Clayey* soils contain a high proportion of clay. They are sticky when wet and hard when dry and so difficult to work. *Silt Loam soils* contain much clay, less silt and yet less sand.

Soil
structure.

But it is inadequate to classify soils only on the basis of texture, which is purely a mechanical or physical property. Soils differ from one another as much in *structure* as in texture, and what is perhaps more important, structure is essentially due to the presence of certain chemical substances like calcium, magnesium, potassium etc., as well as of organic matter, or, as it is often called humus, which is the product of vegetable and animal decay. Soils closely similar in texture are often found scattered over regions widely different in general climatic conditions ; but this is scarcely the case so far as structure is concerned, because structure, being a reflection mainly of the chemical and organic constituents of the soil, must differ from one climatic region to another. Alluvial lands, especially large deltas, are commonly remarkable for their fertility because, in addition to the fine texture of the soil, they contain chemical substances, as well as organic matter, derived from the whole basin of the rivers forming them. The almost inexhaustible fertility of the Ganges delta is an outstanding example. So also are the beds of dried up lakes. The areas of heavy rainfall all the year round are generally much less fertile than we would normally expect them to be, because the rains carry away either into the subsoil or away in the drainage waters huge quantities of mineral plant foods from the soil, and combined with uniformly high temperature the abundant precipitation results in a most chemical weathering of the rocks. The comparative infertility of the Equatorial Regions is a case in point.

Colour of
soils.

Soils also differ in colour, and colour as a fairly faithful reflection of the inner chemical and organic composition of the soil is an important characteristic and index. A red colour ordinarily indicates the presence of iron oxide, a reddish-brown colour that of iron oxide and organic matter, a light colour is an index of a lack of important ingredients, whereas a black soil is almost always found to be extremely rich in plant foods and humus.

Soils may also be very broadly classified as (a) *lime-accumulating* and (b) *non-lime-accumulating* soils. The lime-accumulating soils are, on the whole, alkaline, and

suitable to crops. It is said that the presence of lime usually "indicates an abundance of some or all of the essential mineral fertilizers." Non-lime-accumulating soils cause the formation of acid humus which are generally destructive to crops. There are acid tolerant plants, however ; but they are mostly useless for man and his domestic animals, and the weeds that thrive under acid conditions are often a serious menace to agriculture and transport.

Lime-accumulating and Non-lime-accumulating soils.

Soil Conservation and Soil Treatment.—Soil erosion is caused by various factors, the most important of which is running water. No sooner rocks decompose rain water begins to wash away the particles along the slopes towards the oceans. Soil erosion, we are told, has assumed alarming proportions in the U.S.A., whence nearly 513 million tons of silt and 270 million tons of dissolved matter are annually carried to the sea by the rivers of that country. It has been estimated that this is a loss of mineral plant food approximately twenty-one times as great as that caused by plants by way of the absorption of food. Soil thus removed is said to have totalled that of an area of 13 million acres, nearly double the area of Belgium.¹ Such may well be the history of soil erosion in all lands. But the rate of erosion is by no means even approximately the same everywhere. Even in North America it is widely different. Thus it was once shown by actual measurement that 7 inches of the surface soil was removed from a Missouri farm land in 24 hours, whereas in bluegrass sod the same type of soil is carried away at the rate of only 7 inches in 3,547 years.² Methods of preventing soil erosion must be based on the principle that if all the rain water be completely soaked into the ground where it falls, soil erosion would be reduced to a minimum. Hence methods are to be devised for the storage of as much rain water as possible, as well as to reduce its velocity in order to reduce its power of transportation. But soil cannot be made to store up water indefinitely, because that capacity depends upon its porosity. Hence methods are to be

Soil erosion hazard.

Prevention of erosion.

¹ Case & Bergsmark, College Geography, p. 85.

² Ibid.

employed for increasing the porosity of the soil. How can this be done ? It can be achieved by deep ploughing, thorough incorporation of organic substances in the soil, seeding land to pasture, growing timber, planting cover crops, contour ploughing, hillside ditching, and terracing.

Waning of
fertility.

Rejuvena-
tion of soil.

It has been aptly said that, though the soil may be made to yield indefinitely, it is by no means indestructible. In China thousands upon thousands of acres of land have been cultivated for more than forty centuries, and yet the soil remains fertile. In the Nile Valley they have been raising crops for fifty centuries, and the soil does not yet show any sign of exhaustion because of its yearly rejuvenation by the sediments borne thither by flood waters. On the contrary, the valleys of the Tigris and the Euphrates, once the granaries of the Middle East, are now barren land. Enormous tracts in India, southern Europe, southern U.S.A., are now lying waste, thoroughly depleted. The fact is that however rich a particular type of soil may be, its fertility will decline sooner or later, as a result of cultivation, unless, of course, adequate steps are taken for its rejuvenation, because plants by subsisting on the soil take away its food materials. To offset this, two methods are generally employed. One is to vary the crops on the same plot of land. Since different plants live on different food materials or at any rate on the same materials in different proportions ; this varying of crops prolongs the youth of the soil by drawing out its substances slowly one by one, and yet cultivator is not obliged to sit idle all the while. Moreover, when a particular type of crop is drawing away a particular type of substance the soil finds some time to replenish other types of materials by the natural processes of soil formation. Further, it is not necessary always to root out a plant entirely from the land, and so the residual parts of the plants help to restore to the soil much plant food. But this method of varying the crops does not always give the expected results as it is, in essence, a method only of prolonging the youth of the soil by drawing away from it as little material as possible ; it acts, on the whole, in a negative way. Hence the necessity for adopting a positive

method which would replenish the lost materials. This can only be done by fertilizers. And what might seem rather strange is the fact that the quantity of materials restored to the soil by fertilizers need not be equal to that withdrawn by the plants ; it may be considerably less, and yet the best results are obtained. Strange as it may seem, this is due to the fact that the food absorbed and hence taken away by the plant does not come entirely from the soil, but much of it is derived from air and water as well. A plant containing, say, one ounce of nitrogen might have derived only a fraction of it from the soil, and when fertilizing we are to replenish the soil with only that part of the material which the plant has taken away from it, or even a lesser quantity may be replenished, because the soil also is perpetually replenishing its lost properties by natural means. And just as by the use of manure we replenish the deficiencies of the soil, so by means of irrigation we can remedy the deficiencies of rainfall. But, again, irrigation has its limits, too ; and in many arid or semi-arid lands 'dry farming' is practised. This consists in various ingenious means devised for conserving the moisture contained in the soil. Often stones are spread thickly over the surface in order to prevent evaporation from the soil by the direct rays of the sun.

Fertilizers.

Irrigation.

Dry Farming.

Agricultural Products

(1) **Cereals**—These are cultivated grass whose seeds may be taken cooked or ground into flour or meal. *Wheat* and *Rice* are the two most important food-grains of the world. Other grains are *Oats*, *Barley*, *Rye*, *Maize* and *Millet*s.

(2) **Fruits**—*Banana*, *Pineapples*, *Sugar Cane* and *Mango* are products of the Hot belt. *Citrus fruits*, *Figs*, *Grapes*, *Peaches* and *Apricots* are Mediterranean fruits. *Apples*, *Plums*, and *Berries* grow in cool temperate regions.

(3) **Root-crops**—*Sugar-beet* and *Potatoes*.

(4) **Fibres**—*Cotton*, *Flax*, *Jute* and *Hemp*. *Wool* and *Silk* are animal products.

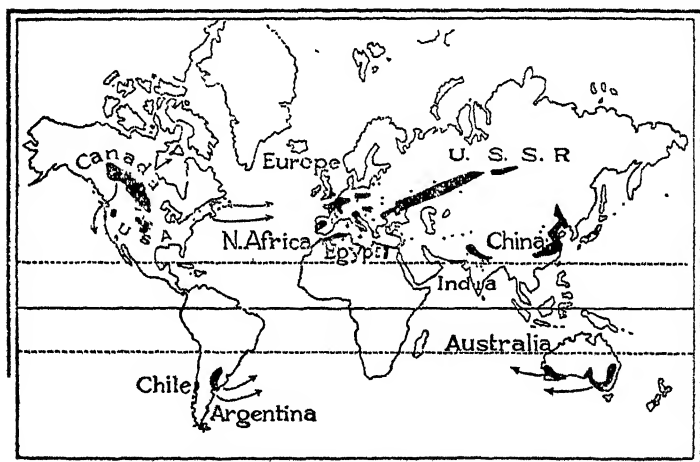
(5) *Tobacco, Coffee, Cocoa, Tea and other Beverages and Drugs.*

(6) *Oil Seeds and Vegetable oils.*

I. Cereals

Varieties.

Wheat.—Wheat like barley, oat, and rye is believed to be essentially a crop of the Cool Temperate lands.¹ The range of wheat is great ; it is cultivated from Alaska and Siberia to the Argentine Republic, and from sea level to altitudes of several thousand feet in the tropical areas² Consequently it has developed a large number of varieties and most of these varieties are so well acclimatized to local



Wheat Lands of the World.

conditions that they would not flourish except in particular regions. Indian wheat does not thrive on English soil, nor does English wheat in an Indian habitat. There has of late been developed a few varieties of wheat which ripen in the short summer of Alaska, north-west Canada and Siberia.

Conditions
of growth.

The climate for the production of wheat must, of course, be temperate, and the weather, during the seeding and germinating periods as well as during the early growth, must be moist and cool ; but warm bright weather

¹ Stamp, *A Commercial Geography*, p. 43.

² J. F. Chamberlain, *Geography*, p. 190.

is essential when the heads of the stalks are being formed, and a little sprinkling rain immediately before the grain begins to ripen ; for the ripening, however, a warm dry weather is absolutely essential. Of all the important cereals of the Temperate Zone, except maize, wheat requires a higher temperature, and that is why its northern limits lie south of the belts of oats, rye and barley.¹ Most of the great wheat lands have three months with an average temperature of 60°F., and a rainfall varying from 15 to 35 inches a year ; but in Australia the rainfall is only 8 inches and dry farming is the rule. The best soils for wheat are light clays or heavy loams. But very heavy clays have also been known to produce large yields of the very best quality of wheat. On lighter soils also the quality may be as good, but the quantity is smaller. The best crops are derived from moderately stiff soils ; but it has been observed that other conditions being favourable any type of fertile soil is quite suitable for wheat. The best wheat lands are to be gently undulating for the use of field machinery, as well as for ensuring good drainage.² The chernozems or black earths of Russia and the American prairies are the two most outstanding examples of the best wheat lands of the world.

Wheat has been classified into two main groups :

Groups of
wheat.

(a) *Winter Wheat*, which is sown in the autumn or 'fall', and hence the name 'Fall Wheat.' Throughout the winter the seeds lie covered in the ground by a layer of snow, and then begin to grow in the spring. In countries where the ground is frozen hard owing to intense cold in the winter, as in the Canadian prairies, winter wheat is a failure. In tropical lands like India wheat is sown in autumn as a winter crop when the rains have ceased, and the crop grows during the winter so as to be ready for harvest before the summer appears with its scorching rays.

(b) *Spring Wheat*, sown in the spring, do, however, ripen at the same time as winter wheat. Countries like

¹ Chisholm's Handbook of Commercial Geography, p. 120.

² "Tenth Census of the U.S.A.", quoted in Chisholm's Handbook.

Siberia or the Canadian prairies where winters are intensely cold produce this type of wheat. In Canada and Russia they have developed a few varieties which ripen during a growing period of 90 days between the last frost of spring and the first frost of autumn.

Character
and
Quality.

Since the different varieties of wheat are highly acclimatized, it is only natural that they should differ from one another in both character and quality. Thus Australian wheats are of a white colour, the American varieties bright red, those of the Mediterranean and Monsoon lands hard, and so on. In order to obtain the best flour different varieties of wheat are blended in varying proportions.

Leading Wheat Producing Countries of the World

Countries	Area Thousands of Hectares ¹		Production Thousands of metric tons	
	Average 1934-38	1950	Average 1934-38	1950
U. S. S. R. . .	40,920	—	38,090	—
U. S. A. . .	22,431	24,488	19,476	27,744
China . .	20,154	—	21,743	—
Canada . .	10,134	10,935	7,170	12,565
Italy . .	5,040	4,716	7,254	7,774
France . .	5,224	4,272	8,143	7,701
India . .	10,312	9,561	7,139	6,208
Australia . .	5,253	4,803	4,200	5,014
Pakistan . .	3,766	4,336	3,183	4,022
Germany . .	1,768	1,523	4,058	3,430
United Kingdom . .	754	1,002	1,743	2,560

¹ One Hectare = 2.4711 acres.

One acre = 3 Bighas 8 chataks.

The world's total production of wheat in 1953 was estimated at 163,600 thousands of metric tons. Wheat-growing countries of the world may be roughly classified into two groups,—those cultivating the crop mainly for home consumption, and those from which large quantities are annually exported. Although Europe, even when Russia is excluded, is still the greatest wheat-producing continent, most of her countries belong to the first group ; of wheat-producing countries, not to speak of export, these countries are to make up the deficiency by imports. Of these only Russia is a notable exception. Countries and states like the U.S.A., Canada, Argentina, Australia etc., export large quantities of wheat every year, and hence belong to the second group. But there are countries, again, which formerly used to export wheat, but now require most of their produce for home consumption. India is the outstanding example among such countries ; Russia is another example, and the U.S.A., of late, has been coming into the line. But why does Europe, Why albeit her large production, import wheat ? This is simply Europe imports wheat ? because her entire production, more than a third of the world's total, is not sufficient to meet her needs ; Europe consumes over half the world's total.¹

Wheat is grown in almost all the countries of Europe. The U. S. S. R. is the largest producer of wheat. Next come Italy and France. But the yield per acre² is moderate, being only 24 bushels an acre. The Mediterranean lands have a still lower yield ; the average in Italy is 21 bushels per acre, in Spain it is as low as about 13 bushels. The countries of North-Western Europe, however, rank very high in this respect ; the average for the United Kingdom has been estimated at 33·5 bushels, for Belgium 40, for Denmark 43, and it is as much as 45 bushels per acre in Holland. Germany gets a return of 32 bushels for every acre of land. It is, again, 21 in Hungary, 17 in Bulgaria, 13 in Rumania ; and although Russia is one of the largest producers of this cereal, if not actually the

¹ Stamp, *A Commercial Geography*, p. 47

² Figures relating to the yield per acre of different countries have been obtained from *The International Year Book of Agricultural Statistics* quoted in *Chisholm's Handbook*, p. 121.

largest, her out-turn per acre comes as low as 11 bushels on the average. The wheat belt of Russia almost completely overlaps with the famous chernozem or black earth which runs right across the south from the borders of Rumania into southern Siberia. The severity of winter obliges the Russian peasant to cultivate spring wheat over most of the region ; all through the rest of Europe the cultivation of winter wheat is the general rule. North America is another important continent for the production of wheat, and the Canadian prairies together with the adjacent areas of the United States form an enormous wheat belt. But the cereal is also cultivated in the comparatively fertile areas of the plateaus within the Rocky Mountain folds. There are thus quite extensive wheat lands in the north-western states. And as in the Mediterranean lands of Europe so also in the Mediterranean land of California this cereal is grown. And yet the average yield per acre in North America is not impressive, being 19 bushels in Canada and only 15 in the United States. Canada is now the world's largest exporter of wheat. As in Siberia so in Canada most of it is spring wheat. In South America the wheat-growing centres are Argentina, Uruguay and Central Chile. Of these Argentine now occupies the second place among wheat exporters of the world. In Asia the important wheat-growing countries are India, China, Japan and Manchuria. In China very little wheat is grown in the south, but in the central and northern parts of that great sub-continent, and particularly in the latter, it is the dominant crop. It has been rather vaguely estimated that a total of about 37 million acres in China is under wheat, and the annual production may be something like 20 million tons. The yield per acre is, therefore, not impressive, although the quantity is quite large. So far as the amount of absolute output is concerned, China and U.S.A., rank second in the world, while the first place is occupied by the U.S.S.R. China does not export wheat. Japan also grows a fairly large amount of wheat, over one million acres being under it ; but it is there only a secondary crop used entirely for home consumption. The average yield

per acre is fairly good—28 bushels. Manchuria, especially the northern part of it, is said to be an ideal wheat country ; but at present about $7\frac{1}{4}$ million acres, or a little more, are under this cereal, and it is still of lesser importance, although some amount of it is annually exported. The most important wheat fields of India lie in the United Provinces, the Punjab ; but there are wheat fields of some importance on the plateau of Peninsular India as far south as the Dharwar district of the Bombay Presidency. Some amount of wheat is also grown in northern Bihar, particularly in the north-western tracts of the province ; but it disappears gradually down the Ganges Valley. The Punjab, however, is the chief wheat-producing region of India. Nearly 30 million acres in India are under this crop ; but the average yield per acre is very low—only 10 bushels per acre annually. The wheat fields of Africa are small, and confined almost entirely to the Mediterranean regions like Morocco, Algeria, Tunis, Africa, and above all, Egypt. The Cape Town region on the south-western coastal fringe of Africa has also a Mediterranean type of climate and produces small quantities of wheat. There are two wheat belts in Australia,—the one in the south-east where there is rainfall all the year round, the Australia, other in the south-west where Mediterranean type of climate prevails. Of these the former is by far the more important belt, and though there is rain at all seasons the amount of precipitation is not heavy, varying as it does from 10" to 40" annually, and the production of wheat is concentrated more especially in the areas where rainfall ranges from 20" to 30". The Mediterranean region which receives its heavenly moisture during the winter has an average rainfall of 20" to 40".

Wheat is of course a natural food crop, and ranks the highest amongst the food grains in respect of the total acreage under it. From the point of view of world production, however, it can be bracketted with maize and rice. But it is by far the most important of the food grains from the point of view of international trade.¹

Position of
wheat as
regards
production
and trade.

This table has been taken from Stamp, *A Commercial Geography*. It may be noted here that the figures are only

The Relative Importance of Chief Food Grains

Crop	Acreage in millions of acres	Annual production in millions of metric tons	Percentage of total export
Wheat .	330	125	20
Maize .	200	125	6
Rice .	200	125	4
Oats ..	150	75	2
Rye ..	120	35	3
Barley .	100	40	7

Preparations of wheat.

The chief use of wheat is of course for food ; by far the greatest portion of the world's total output is milled into flour, and, as already mentioned, different varieties are often blended for obtaining the best flour. Of the various sorts of food prepared from wheat may be named, besides loaves and bread, the Italian delicacies called macaroni and vermicelli. Large quantities of starch are also obtained from wheat, while the straw is extensively used for fodder, for stable mattresses, straw boards and the cheaper grades of wrapping paper.

World trade in wheat.

The quantity of wheat entering into the world trade was, it has been estimated, something like 17·4 millions of tons on the average annually during 1909-13 ; during 1921-25 it was about 17 millions, and in 1931-33 something like 17·7 million tons. Since the trade is on the increase the total at present is about 20 million tons a year, and with this we are to add another 4 million tons of flour. The chief exporters, as it can be seen, are Canada, Argentina, the U.S.A., and Australia. The chief importers are the United Kingdom, Italy, Germany, France, Belgium, Holland and Switzerland,—and also both Japan and Brazil.

Barley—Barley is now the most widely distributed cereal, and many writers are of opinion that it is the oldest

approximate, and that "grains form an important part of the diet of over 99 per cent. of mankind"

of the cultivated grains.¹ It matures in Norway as far north of the Arctic Circles as 70°N., and in Liberia within 10° of the Equator.² Any soil or any climate that is good enough for wheat is also good for barley, and it is in such climate and soil that the best barley is grown. But its range is wider than that of any other cereal. It can also mature very quickly, and thus flourish in the short northern summers or in "the brief warm spells of high mountain valleys." It also flourishes in most of the Mediterranean lands. But it grows in drier regions than wheat. On the whole, the wheat-growing regions and the barley-growing regions coalesce rather intimately, especially in the southern countries of Europe as well as in lands surrounding the Mediterranean, which are too dry in summer for maize ; but barley is commonly restricted to the drier and colder and hotter parts, as well as to a poorer soil. In the northern countries of Europe the barley-growing regions coalesce with those of oats, because these lands are generally too cold for wheat. Europe is the largest producer of barley, growing about half the world's total, and Russia is by far the most important barley-producing country in Europe, with nearly one-third of the world's total produce. The U. S. A., China, Germany, Japan, Canada, Spain, India, North Africa, Rumania, Poland, Czechoslovakia are the other important producing countries. The whole of the Southern Hemisphere produces only about 2 per cent. of the world's total. Generally speaking, the yield per acre of barley is larger than that of wheat.

The following table shows the production of Barley in 1953 in different countries of the world (in thousand metric tons) :—

Countries	1953	Countries	1953
1. China	.. 6,970	5. Japan	.. 2,091
2. U. S. A.	.. 5,247	6. Denmark	.. 2,181
3. Canada	.. 5,706	7. Spain	.. 1,492
4. India	.. 2,895	8. Germany	.. 2,072
World's Total (Except U.S.S.R.)—54,800.			

¹ Op. Cit., p. 130.

² J. F. Chamberlain, *Geography*, p. 199.

Prepara-
tions of
Barley.

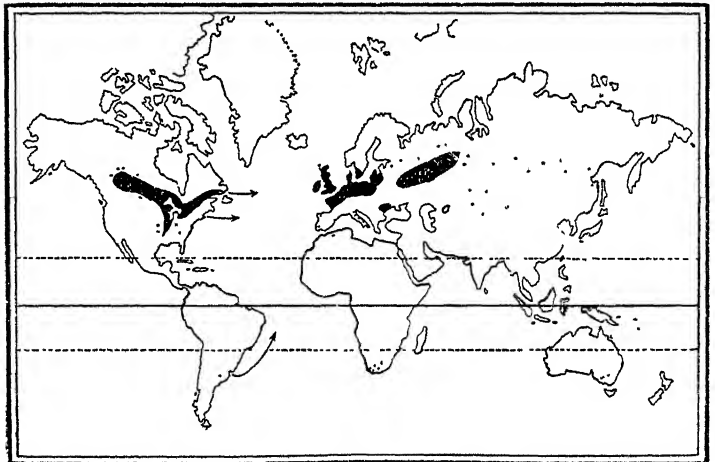
The chief use of barley, like that of wheat, is for food. Barley-bread is an important article of food in Japan, Scandinavia, India and North Africa. But the bread is rather heavy, and with the rapid extension of commerce barley has come largely to be replaced by wheat. It now forms part of the ration for horses, cattle and pigs in many countries. One of its chief uses for man now is in the form of drink, not food, since it is extensively used in the preparation of alcoholic drinks like beer and whisky. Large quantities of starch and malt are obtained from the grain.

World
Trade in
Barley.

The chief exporters of Barley are Rumania, the U. S. S. R., the U. S. A., Canada, Poland, Argentina, India, Australia, etc. The importers, it is interesting to learn, are the great beer-drinking countries of Europe. The principal importers are the United Kingdom, Germany, Belgium, Holland and other countries of West Europe.

Conditions
of growth.

Oats.—The conditions best suited for the production of this crop are basically the same as those for the



The Oatlands of the World

cultivation of wheat and barley ; but oats require, on the whole, a more moist and cool climate. It has a wider latitudinal range than wheat, and thrives well on a greater

variety of soils.¹ Oats have a wider range than both wheat and barley, because they grow in regions which may be a trifle too dry for wheat, but not at all so for barley, as well as in regions which are too wet for both. Moreover, oats thrive well in areas too cool for wheat, but not at all too cool for barley. But wheat and barley easily flourish in climes too hot for oats. Thus it happens that in the northern countries of Europe oats are the associates of barley, not of wheat; but in the southern countries of Europe, the former generally penetrating farther south just as it pushes beyond the oats belts in the cold north; whereas in the wetter parts of the Temperate Zone oats only predominate. Thus in the western parts of the British Isles, which are damper, oats grow in abundance, but not a stalk of barley is to be seen.

The great oat-producing countries of the world are : the U.S.A., Russia, Germany, Canada, France, Poland, Hungary and the United Kingdom. Europe, excluding Russia, produces about 40 per cent. of the world's total production. It is a very important crop in Ireland and Scotland, and if we take the British Isles as a whole we find that it is the leading cereal there. Large quantities of it are also grown in Denmark, Holland, Belgium and the lands surrounding the Baltic Sea. Besides the United States, Canada is an important producer of oats. The Argentina and Chile, however, are practically the only oat-producing countries south of the Equator.

Production of Oats in 1953
(Thousand Metric Tons)

Canada	.. 6,276	U. S. A	.. 17,656
France	.. 3,663	China (1952)	.. 814
Germany	.. 2,554	Argentina	.. 1,000
United Kingdom	.. 2,866	World	.. 48,600

Oats usually are used as food for horses and cattle, and that is one of the reasons why it is imported in large quantities into countries engaged in the dairying industry. But it is also—though rarely—used for human consumption. Oatcakes, oatmeal porridge and some other like delicacies are well appreciated in Scotland and some of the Scandinavian countries. In the former place these

Uses of
Oats.

¹Chisholm's **Handbook**, p. 129.

delicacies formed the staple food of the people as late as the end of the eighteenth century.

**World
trade in
oats.**

The quantity of oats entering into world trade is however, meagre ; only about 4 per cent of the total production comes to the international market. This is because, with the exception of one or two countries like the Argentine and Chile, for example, most of the countries produce it for home consumption. Argentina, Canada, U.S.A., Rumania etc., are the leading exporters. The chief importer is Great Britain ; of the other countries importing oats Switzerland, Belgium, Holland, Austria and Denmark are important,— countries engaged extensively in dairy farming.

**Conditions
of growth.**

Rye.—Rye has been well described as a “poor relation” of wheat ;¹ it grows, therefore, under conditions similar to the growth of the latter crop. But it is a hardier plant than its ‘aristocratic relation’, and has no such exclusive choice of soil ; it will flourish at a lower temperature and in much poorer soils, and is, therefore, cultivated in both high latitudes and high altitudes. In Russia a large quantity of rye is grown far to the north of the celebrated ‘Black Earth’ Zone, and in Norway, because of the moderating influence of the warm ocean current, it is cultivated as far north as the Arctic Circle.² It is grown extensively on the marshy and sandy tracts of the Great European Plain, as well as on the Central Plateau of France and the North-Western highlands of Spain.

Production

Europe is the leading producer of rye, and of all countries Russia ranks the highest in this respect. The bulk of the world’s rye—nearly 95 per cent—is grown on the mainland of Europe and Asiatic Russia. Other leading producers, besides U. S. S. R., are Poland, Germany, Holland, Denmark, Czechoslovakia, France, Portugal, Italy etc. Important producers outside Europe, are U. S. A., Canada, Argentina and Japan. The worlds’ total production in 1953 was estimated to be about 48 million metric tons.

It is the staple food of the peasant population of nearly half of Europe ; but the bread is somewhat heavy and sour,

¹ Stamp, *A Commercial Geography*, p. 54

² J. F. Chamberlain, *Geography*, p. 197.

and is quite dark in colour. So, it is not very popular as food. Of the several alcoholic drinks prepared from rye, vodka, so popular in Russia, and rye whisky are important. The straw of rye is long and tough, and is used in making straw hats, mats, ropes and certain kinds of cheap paper and pasteboard. In some parts of Europe houses are said to be thatched with this straw.

Rye is grown almost entirely for home consumption. So the international trade in this commodity is quite small. The small amount of trade is between the U.S.A., and Canada on the one hand and the rye-consuming countries of Europe on the other. The Argentine has of late been exporting some rye to Europe. But the U.S.A., is now the chief exporter.

Rice.—Rice is essentially a tropical and sub-tropical food grain, suited more to the Tropical Monsoon Lands than to any other part of the Torrid Zone. It is in all probability a native of India ; for it is the only cereal which still grows wild in this country.¹ Many are of opinion that it was first introduced into China as early as 3000 years before the beginning of the Christian era.² It was first taken to America in 1694. There are numerous varieties of rice, and the total number probably exceeds that of the varieties of wheat.³ And many of these exhibit quite strong local preferences. Very broadly we may reduce these innumerable varieties into two,—(a) *Lowland* or *Swamp Rice*, and (b) *Upland* or *Hill Rice*. Upland rice is grown generally on hill slopes, but the other variety is by far the more important. Lowland or Swamp rice is grown on flat plains capable of being readily flooded when necessary. Rice can be grown on a variety of soils, but a free loam affording good conditions for root-development with a heavy clay sub-soil capable of retaining water is best suited for it. Hill rice naturally thrives on drier soil, and in India it is grown even at an altitude of 8,000 feet ;⁴ but it is comparatively unimportant.

¹ Case & Bergsmark, *College Geography*, p. 214.

² J. F. Chamberlain, *Geography*, p. 199.

³ Stamp, *A Commercial Geography*, p. 55

⁴ Chisholm's *Handbook of Commercial Geography*, p. 194.

Cultivation.

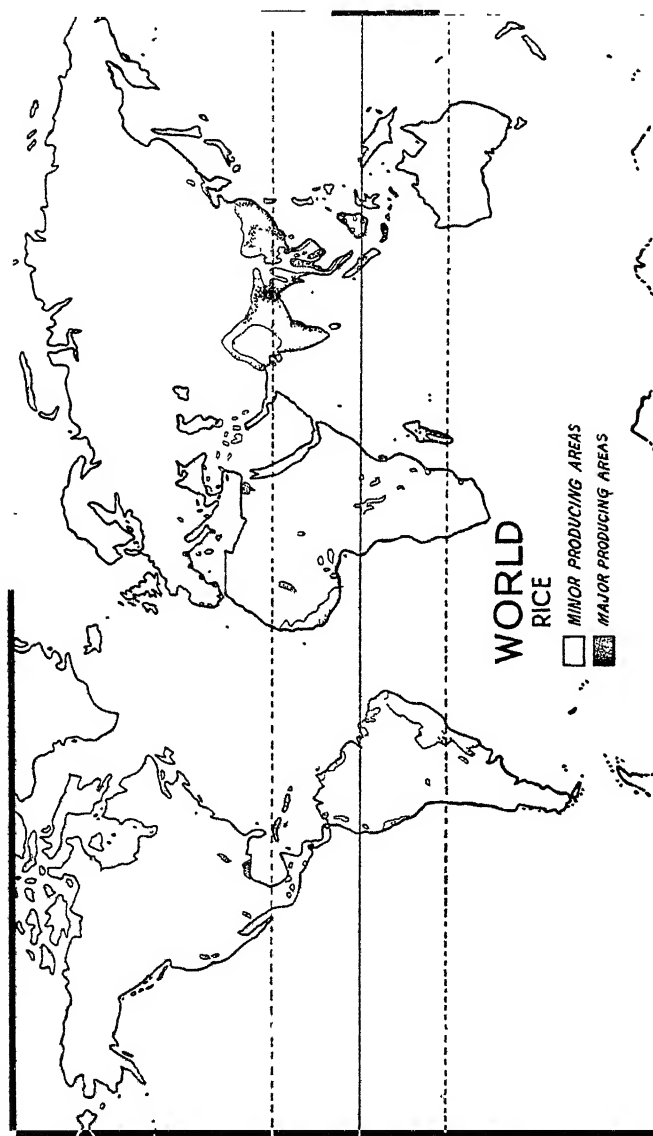
For the cultivation of lowland rice the fields are first roughly ploughed under water, which is prevented from draining away by means of carefully raised embankments on all sides of the field, and the seeds are sown as in nurseries. Then the tiny plants begin to grow under the water till they shoot out their fine stalks about six inches above the water level, when the cultivator transplants them by hand in several rows in the flooded fields. As the plants begin to grow the water is allowed to drain away gradually, and by the time the paddy ripens the fields are dry. For the ripening of paddy a temperature between 75°F., and 80°F., is needed. Rainfall must be abundant during the sowing season as well as in the earlier part of the growing period. But excessive showers during the ripening season is extremely injurious, sometimes even causing a total failure of the crop. That is why rice is best grown in the Tropical Monsoon lands. Where the annual rainfall is below 45" it is seldom raised. If the temperature be uniformly 80°F., or a little higher during the ripening period, the grain matures with almost incredible rapidity and under like conditions as many as five crops a year have actually been harvested.¹ Usually, however, two crops are obtained annually. In more temperate regions rice is a summer crop, wheat or another temperate cereal being the winter crop. It has an average growing period of 135 days.

Leading Rice-producing countries of the World.

Countries	Area in thousands of Hectares		Production in thousands of metric tons	
	Average 1934-38	1950	Average 1934-38	1950
China (22 Provinces)	19,771	19,000	50,065	50,000
India (Reporting area)	22,307	29,200	34,182	30,865
Non-reporting area	1,520		2,664	
Japan	3,169	2,994	11,501	12,064
Pakistan	7,562	8,749	11,169	12,490
Burma	4,931	3,986	6,971	5,200
Java and Madura	3,843	3,722	6,081	5,651
Philippines	1,990	2,184	2,179	2,765
Thailand	3,370	5,250	4,357	6,782
U S. A	387	651	956	1,755

Total World production of rice in 1953 was estimated at 168,600 thousands of metric tons.

¹ Stamp, A Commercial Geography, p. 56.



Leading producers.	India and China are the two leading rice-growing countries of the world, without even a close second. The next largest producer is Pakistan. The other important rice-growing countries of Asia are Japan, Indo-China (both British Indo-China which is Burma and French Indo-China) and Siam (Thailand) ; Ceylon, Malaya, and the East Indies do not grow as much rice as is needed for home consumption. In Europe rice is somewhat important only in Italy and Spain. In Africa Egypt is an important producer, with Sierra Leone a close second. In North America fairly large quantities of rice are grown on the coastal region of the Gulf States near the Mississippi delta and in the Sacramento valley of California. It has also been introduced in British Guiana. The coastal regions of Brazil and Guiana in South America are fairly important in this respect.
Other countries.	

Preparation and Use of rice.	As is quite well-known, the first operation after harvesting is the threshing of the paddy, which is then put through the hulling machine. The grain is next screened and the kernels polished. Rice is thus given a white look and rice flour is obtained through this operation of polishing. The straw is used in making mats, ropes, bags, hats, raincoats, sandals, and even houses are sometimes thatched with it. The husk is used for filling mattresses and in packing goods. A number of distilled liquor and other intoxicating drinks are made from the germinated grain. Rice being richer in carbo-hydrates than wheat, considerable amount of starch is also made from it. Rice is the staple food of nearly one-third of the world's population. The whole of the enormous quantities grown in India and China is consumed at home. So it is in Japan, which, in addition, imports large quantities from other places in order to meet her internal needs. Rice is also the staple food in Burma, Siam and French Indo-China; but these countries, thinly peopled that they are, produce a larger quantity than is needed for home consumption, and can, therefore, spare a good deal to carry on an export trade. Ceylon, Malaya and the East Indies, on the other hand, cannot produce enough to meet the internal demand,
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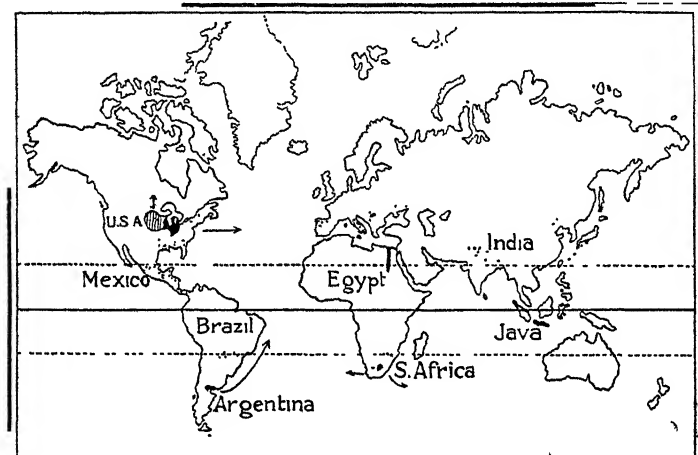
and are, therefore, obliged, like Japan, to import some amount of rice. In Europe and America highly polished rice and rice milk-puddings occasionally enter into the menu of the well-to-do people more as delicacies than as food.

Since most of this crop is produced for home consumption, the amount entering into world trade is but small,—^{World Trade in Rice.} only just over 6 million tons a year. The principal part of the trade—from about a half to two-thirds—is between the Asiatic countries, and the remainder between the rice-exporting countries of Asia, and rice-importing countries of Europe. Indeed as pointed out by Stamp, the world trade in rice is of two types. The first type consists in exporting the surplus rice from one rice-eating country of the Orient to another for the purpose of making up the deficiencies of the latter. This trade, as is quite inevitable, varies from year to year as the harvests in these countries fluctuate. If there is a marked scarcity in China in any year the bulk of the surplus will go to that country ; next year Ceylon or India may import a greater amount than previously, and so on. The second type consists in exporting rice from the Orient to Europe and other countries. This aspect of the trade remains fairly constant, although it, too, fluctuates markedly if there is a famine in any of the larger rice-eating countries. The U.S.A., grows about half the quantity required for home use, and imports the remainder from the Far East. ^{Two types of trade.}

Maize or Corn.—Another name of this crop is Indian Corn, and it is said to be the only cereal brought from the New World to the Old. Columbus was the first to bring it to Europe.¹ It was probably a native of Mexico or Central America. But in America it is now concentrated in the U.S.A. It is essentially a sub-tropical grain, but may easily be grown in the warmer areas of the Temperate Zone, as well as in the Tropics, but not generally in the Monsoon lands. A fertile, well-watered, loamy soil is essential for its production ; during the early part of the ^{Conditions of growth.}

¹ Chamberlain, Geography, p. 187. See also Chisholm's p. 127.

growing period it must have frequent and fairly heavy showers, and where rainfall is not abundant water must be supplied by irrigation ; but on no account should the ground be drenched through and through. Thus it agrees with rice in some respects, and also differs from the latter in others. The average life of the plant is from 135 days to



The Maize-producing countries of the World

210 days ; and all through this long period there must be plenty of sunshine and an uniformly high temperature with as little variation as possible. In the middle period of its growth even a moderately marked variation in the diurnal range of temperature causes almost a total failure. Hence it is very nearly impossible to grow maize in such a fickle-weathered country as England.

Production. The U. S. A., is the largest producer of maize in the world. About $\frac{2}{3}$ of the world's production is raised in the country. It is also grown in Mexico in fairly large quantities. But Canada, though she produces a little, is too far north for the Indian corn. In South America, Brazil and the Argentina grows much corn. In Europe it is grown in the warmer and wetter regions like Rumania, Yugoslavia, Hungary and Italy, as well as in the U. S. S. R., south of the great Wheat Belt. Small quantities are grown also in the sunnier and moister parts of France and Spain.

In Africa, the Union and Rhodesia are important maize-producing countries. It is said to be the most important of the cereals in that continent, though the total yield is not quite appreciably high. In Asia it is a subsidiary, though not quite an unimportant, crop, particularly in India and China. Australia also produces a small quantity.

Leading Maize-producing Countries of the World.

Countries	Area Thousands of Hectares		Production Thousands of metric tons.	
	Average 1934-38	1951	Average 1934-48	1951
U. S. A. ..	37,831	33,771	53,066	77,671
China (22 provinces)	4,712	5,000	6,497	6,344
Brazil ..	4,092	4,380	5,677	6,218
Mexico ..	2,976	4,000	1,665	3,000
Yugoslavia ..	2,672	2,206	4,708	2,081
Italy ..	1,458	1,241	3,000	1,923
India ..	2,233	3,467	2,210	1,990
Argentina ..	4,362	1,860	7,892	2,670
Union of South Africa ..	2,357	2,301	1,995	2,721

World's total excluding U.S.S.R. in 1953 was estimated at 131 million metric tons.

Preparation
and Use
of Maize

Maize has various uses. It is used chiefly as food for animals, particularly for hogs and pigs, and that is the reason why great numbers of hogs are kept in the famous Corn Belt of the U. S. A., and its absence in the British Isles is one reason why so few hogs are raised there, and most of the pork consumed by the Britishers are imported from elsewhere. But maize forms an important article of human food as well. Though it does not make good bread, the well-known 'mealie pap' or maize gruel is extensively used in South Africa. In England cornflour, which is made by grinding the grains of maize or corn, is fairly extensively used. Corn bread and corn cakes are extensively consumed in America and Southern Europe. The unripe corn is a favourite vegetable in America. Starch, beer, alcohol, and glucose are other important products of maize. Some kinds of cheap paper are manufactured from its leaves ; the cobs are made into pipes

and the husks are used into mattresses. Another use of the cobs is in the form of fuel. The young juicy stalks as well as the ripened grains are used as food for cattle and stock.

World
Trade.

Though the production is quite large, only a small percentage of the total produce enters into world trade ; yet the amount is greater than that of rice coming into the international market ; for while only 4 per cent of rice enters into world trade, the corresponding percentage of maize is 8. The United States exports a very limited quantity ; more than half of the commodity exported comes from Argentina. Other exporters, besides these two, are South Africa and the countries of South-eastern Europe like Hungary, Rumania, Bulgaria, and the U.S.S.R. The chief importers are the countries of the north-western Europe, because the cool climate of these regions does not allow the cultivation of this crop.

Conditions
of Growth

Millet.—Millet is one of the most important of the small grains used as human food. It is characteristic of the drier parts of the Tropics, and has many varieties, some of which flourish in the drier and warmer parts of sub-tropical lands. It grows well in regions having less than 40 inches of rainfall, and even where precipitation is as low as 20 inches it can be grown without irrigation.

Production
and Use

Both in India and China it is an important food crop. In India it occupies a fifth of the total cultivated area and more than a quarter of the area under food-grains. It is the staple food of the people in nearly all the drier regions of this country, and ranks an easy second to rice among Indian crops. There are three main varieties of this crop in India—(a) *cholum* or *jowar*, which in English parlance is called 'Great Millet,' (b) *cumbu* or *bajra*, called in English 'Spiked Millet', and (c) *ragi* or *marua*. In China millet is concentrated in the north-east, where the rainfall is usually below 40" a year. Throughout North China it is a close second to wheat. *Sorghum* and *kaoliang* are the two chief varieties. Millet is also extensively grown in Manchuria and Japan, and the varieties raised are similar

to those of China. In the Uganda region of Africa millet is the most widely cultivated crop, and throughout the continent becomes an easy rival of maize, if it does not actually outweigh the latter in importance as a food grain. The chief variety is the 'Great Millet' known there by the name of *durrah*; often it is also called 'Guinea Corn'. Besides being raised for food, millet is grown also for forage and fuel. A particular type of sorghum is cultivated in the U.S.A., for green fodder. Fairly large acreages in the poorer lands of Europe are also devoted to this crop. Trade. Its importance from the point of view of world trade is next to nothing, since almost the entire yield is raised for domestic use.

II. OTHER VEGETABLE FOOD-STUFFS

Sugar.—Sugar is of three main varieties,—(a) *Cane Sugar*, (b) *Beet Sugar*, and (c) *Maple Sugar*. Cane sugar is the product of the juice of the sugar-cane; beet sugar is obtained from the 'roots' of the sugar-beets; and maple sugar is manufactured from the sap of the maple tree. Three main varieties.

The **sugar-cane**, originally a native of Eastern Asia,—perhaps of the Ganges Valley and Indo-China—is essentially a tropical or sub-tropical plant. It flourishes in a warm moist climate, and requires a soil rich in phosphates; wholesome sea-breezes are also essential, and that is why all the great cane-growing regions are located near about the sea. But the moisture has its limits, too; an annual rainfall of 40 inches or a little more is ideal for the plant; too much moisture reduces the sugar content in the juice. The leading countries from the point of view of production are India, Cuba and Brazil; of these India is now the largest producer so far as absolute production is concerned; but she is far behind in relative production, *i.e.*, in regard to the yield per acre or per ton of cane. In this Java easily leads, and Cuba comes second, while India still remains far behind.¹ In America the important producers are Louisiana Production of Cane Sugar.
India, Cuba & Brazil.
America.

¹ Stamp, *A Commercial Geography*, p. 62. But see Chisholm's *Handbook of Commercial Geography*, p. 196, where it is definitely stated that "the largest producer is now Cuba...."

in the U.S.A., and the Brazilian and the Peruvian coastal tracts ; in the latter area cane-culture is carried on by means of irrigation. There are plantations also in Central America, Argentina, and British Guiana. The smaller islands of the British West Indies are largely dependent on this industry alone. The U. S. A., obtains large supplies from the Hawaiian Islands. In Africa by far the most important cane-growing region is on the east coast of Natal ; small plantations are found elsewhere, chiefly in the narrow coastal region of Portuguese East Africa, Egypt, and the island of Mauritius. In Australia sugar-cane is grown in Queensland on the north-east coast. The Phillippine Islands, Java, China and Formosa are also important producers in Asia. In Europe there are small plantation only in the southern parts of Spain as for north as 37°. In Southern Hemisphere its farthest poleward extent is said to be marked roughly by the 30th parallel.

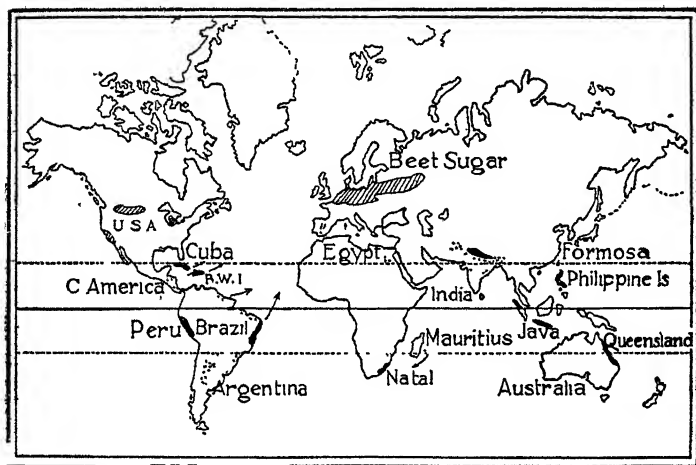
The world's total production in 1950 was estimated at 257 million metric tons.

World's Production of Sugar-cane
(in 1,000 metric tons)

Countries	World's Production 1950	Percentage of the World's total. 1950
India ..	57,060	22·2
Cuba ..	44,948	17·5
Brazil ..	32,671	12·7
Mexico ..	9,830	3·8
Porto Rico ..	9,527	3·7
Columbia ..	7,962	3·1
Australia ..	7,165	2·8

Preparation of Cane Sugar. The sugar-cane, like the cereals, is botanically a member of the grass family ; but it is a giant member of that genus, its stalks sometimes attaining a height of twenty feet. But its seed or grains is of little or no value. The stalks of the cane are cut every year on the eve of flowering, but the roots are allowed to remain, and from

these new shoots grow each year for a period of about thirty years or more, although for commercial purposes the plants are usually completely rooted out at the fifth year, and new plants raised. The stalks mature in about ten months, when they are cut by hand and hauled to the mill



Sugar-producing Countries of the World

for squeezing out the juice. The juice is then clarified and sterilized by boiling at a temperature of 130°F., and by mixing some lime with it. This sterilizing prevents fermentation. Again it is boiled until it reaches the point of crystallizing. Crystalline raw sugar is then made to separate out by being placed in centrifugal separators. Thus is obtained brown sugar which is of a lusty golden hue, and the residual thick syrup goes to form molasses. The crude brown sugar then is transported to the refineries, where it is dissolved in hot water and filtered, and the liquid then evaporated in vacuum pans, and the sugar naturally crystallizes. Molasses is consumed by men as well as cattle, and is used in preparing certain alcoholic drinks like rum. After the extraction of the juice the canes are used as fuel for the mills. Various types of cardboard are also made of sugar-cane.

World
Trade in
Cane
Sugar.

Although India is now the largest producer¹ of cane sugar she does not export any, but consumes her entire production. She used to import large quantities of sugar from Java till very recently, and ranked third in the world as an importer ; now her imports have very nearly ceased.

The chief importers are the United States and the United Kingdom. The U. S. A., besides having a large proportion of home production, obtains considerable quantities from Cuba, Dominica, Porto Rico and Hawaii. Great Britain imports her sugar mainly from the Empire countries like British Guiana, Mauritius and the British West Indies, as well as from Cuba and Java.

Production
of Beet
Sugar.

The **sugar beet** is said to have found its way into Europe from Southern Asia. It is an annual plant belonging to the beet species. The seed is sown in the spring, and the roots of the plant are dug out in the autumn. It requires a lower temperature and less water than does the sugar-cane ; but the soil must be well-drained, and a fairly good supply of moisture is essential during the growing period, although too much moisture gives a juice poor in sugar content. A fertile, loamy, lime-accumulating soil is ideal for the cultivation of this plant ; it does not thrive on non-lime-accumulating soils. Generally, it likes a long growing period, with the latter part warm and sunny. There must also be freedom from frost from seed time to harvest. The important sugar beet-producing countries are Germany, Russia, France, Czechoslovakia and Poland in Europe, and the United States of America. There is, broadly speaking, a continuous sugar beet belt in Central Europe, stretching from France across Belgium, Holland, Germany, Czechoslovakia and Poland to Rumania and the Ukraine in South-Western Russia. The sugar beet area of Spain is also considerable. In the U. S. A., many states, especially those in the north and west, cultivate this plant in large numbers. Fairly large quantities are now being

¹ The fact seems to be that till lately—as late as 1936-37—Cuba was the largest producer. The production in India has increased only recently. This is shown by the steady decrease in her imports from Java.

produced in England also. The U. S. S. R. is now the largest producer of sugar-beet in the world with about $\frac{1}{3}$ of the world's total production.

The 'roots' of the sugar beet mature much earlier—in from four to six months—than the stalks of the sugar-cane. The beets are dug by machinery, and after cutting the leaves in order to leave aside the superfluous mineral matter, they are carried to the factory, where these 'roots' are sliced and soaked in warm water for extracting the juice. The preparation of sugar from the beet then is much the same as that of sugar from the sugar-cane. The pulp is used as a food for stock.

Normally, the trade in beet sugar is less than cane sugar, as most of the countries grow sugar beet for home consumption. The trade also suffered a great set-back owing to the world war II and has not yet recovered. In normal times Germany, Czechoslovakia, Poland etc. are the exporters and United Kingdom, U.S.A., Italy etc. are the importers.

The maple tree is of many varieties, many of which yield a juice from which sugar is manufactured. Of these the sugar maple is the most important. In the eastern parts of Canada, the U. S. A., and the north-eastern states of the Union of South Africa sugar is obtained from these trees. The process is rather simple : the trees are tapped and the juice collected, which then goes through the processes of evaporation and crystallization for the extraction of sugar. But the production of maple sugar has steadily decreased owing to various causes ; it does not pay enough for encouraging the producer to undertake vast scale production, because of the cheaper price and far greater output of the other two varieties of sugar, and maple sugar is extensively adulterated. Moreover, the number of maple trees both in Canada and the U. S. A. has also steadily decreased owing to extensive cutting for lumber. It is now used almost exclusively as a luxury rather than as food ; for its present-day demand is entirely due to its peculiar

Preparation.

World
Trade in
Beet
Sugar.Production
of Maple
Sugar.Present
position of
maple
sugar.

flavour.¹ It has ceased to have any commercial importance in the international market.

Other sources of sugar. Other sources of sugar are the various species of the palm tree, particularly in the tropical countries. The Indian date palm, the Palmyra palm, the cocoanut palm, the toddy palm, and the sago palm are exploited for sugar in India.² Nevertheless the sugar-cane and the sugar beet are now the two most important sources of sugar all over the world.

Cane Sugar vs. Beet Sugar. Both sugar-cane and sugar-beet have certain characteristic advantages, each over the other. Sugar-cane is easy to cultivate ; it is grown mainly in the tropical and sub-tropical countries, where labour is very cheap ; sugar-cane also is naturally richer in sugar content. Beet, on the other hand, is an exhausting crop, requiring a richer soil and a plentiful supply of potash manures ; it must be sown every

Advantages of Cane Sugar. year and is restricted to regions where labour is by no means so cheap as in the Tropics or thereabouts. But beet has its advantages too : it is grown in areas of dense population, and hence, near local markets, whence the raw materials used in the refineries are easily and relatively cheaply obtained, and where at the same time the finished product can be readily sold without entailing enormous

Advantages of Beet Sugar. freight charges for transportation. This density of population has other advantages also ; a regular and abundant supply of manures can be readily obtained ; capital can easily be raised and on a lower rate of interest ; machinery can be more cheaply installed and readily repaired or replaced. The methods of selection as employed now-a-days has also successfully combated the natural disadvantage of less sugar content in the beet under the scientific technique or selection, a given weight of sugar-beet has a greater amount of sugar than the same weight of the sugar-cane. Furthermore, the refuse material and by-products of beet are of a much higher value than those of the cane. The beet-pulp is good fodder for animals as well as a useful manure for the soil : whereas the residual

¹ Chamberlain, Geography, pp. 248-251.

² Chisholm's Handbook, p. 201.

matter of the sugar-cane is used mainly for fuel. Yet all these advantages are scarcely enough for successful competition of beet with sugar-cane, and in the opinion of many experts there would hardly be any beet sugar production if it were not for an artificial stimulus in the shape of bounties, protective tariffs and the like.¹

Government help in production of Beet Sugar.

Cocoa.—Cocoa is a product of the cacao tree, which is essentially an equatorial plant of the pod-bearing genus. It is rather a small evergreen tree. The pods vary from six inches to a foot in length, and instead of being attached to the ends of twigs they grow directly from the stem or larger branches. These pods vary in colour from green to a dark purple. The seeds or beans lie embedded in a soft white pulp within the pods in regular rows of often as many as fifty, and are about the size of almonds. Cocoa is obtained from these seeds or beans. It requires uniformly high temperature and an abundance of moisture ; exposure to the direct rays of the sun is harmful to it, especially in the growing period, and hence it is grown in the shade of taller trees. Like direct sunshine, strong winds are also injurious, especially to the pods ; hence the Belt of Calms or Doldrums is the ideal situation. Valleys well protected from dessicating winds, and clearings in the dense Equatorial Rain Forests are good situations, since in the latter case the surrounding forest acts as a check to the inblowing winds. The tree develops a long root, and hence requires a deep moist well-drained soil. The cocoa tree can stand no frost.

Conditions of Growth.

The pods are cut from the trees at harvest time, split open on the ground, and the pulp is allowed to ferment and ooze out ; the seeds are then dried in the sun, roasted, and the husk removed ; then comes in the operation of removing the fat or 'cocoa butter' from the seeds by applying pressure ; when as much fat has been pressed away as is deemed essential, the seeds go through the process of grinding. Thus at last we have the cocoa with which we are familiar. Another well-known product is chocolate, which is made by retaining some of the fat and adding sugar.

Preparation of Cocoa.

¹ Ibid.

British West African possessions, and the plantations in the Gold Coast and Nigeria supply more than a half of the world's total. Brazil in S. America is the second largest producer. Other important producers are Ivory Coast, Dominica, Trinidad, Fr. W. Africa, Cameroons, Equador etc.

Production of Cocoa

1953

(In Thousand Metric Tons)

Gold Coast ..	..	240	Fr. West Africa ..	72
Brazil ..	..	109	Cameroons ..	60
Nigeria ..	..	106	Dominica ..	25
World's Total Production ..				750

Exporters
and
Importers.

The leading exporters now are the Gold Coast, Brazil, Nigeria and the Ivory Coast, Dominica, Trinidad and the West Indies and Central American states. The leading importers are the U.S.A., Germany, the United Kingdom, Holland, France, and other European countries.

Conditions
of Growth.

Coffee.—Coffee is a product essentially of the tropical or sub-tropical lands. The coffee tree, said to be a native of the Far East, is also an evergreen plant with shiny leaves. Left to itself the tree will grow to be twenty-five or thirty feet in height, but on the plantations they are usually kept pruned down to a height of three to eight feet. It requires a moderately high temperature and an abundant rainfall ; but more important still is perhaps an equability of temperature, and protection from the direct rays of the sun. But unlike the cocoa tree it can stand mild frost. A fertile, well-drained soil is also highly important, and clearings in forest lands are said to be ideal because of their richness of vegetable remains. The tree comes into full bearing in six years, and continues to flower and bear fruit with almost undiminished vigour till the thirty-fifth or forty-fifth year, after which the soil becomes thoroughly exhausted and must be abandoned. It is a peculiarity of the coffee tree to flower for several months so that fruits and flowers are found on it at the same time, and hence two or three gatherings a year are needed. Coffee is obtained

from the seeds or beans of the tree. Commonly two beans, Preparation with their flat sides together, are enclosed by the pulp, of Coffee. which, after the picking is over, is removed by soaking the berries in water or by hulling. The beans are then dried in the open air on floors of brick or tile.

The bulk of the world's coffee comes from Central and South America. In Brazil it is the leading crop ; in fact, Production. the only developed part of that enormous republic is the strip along the Atlantic coast from the mouth of the Amazon to the region of Sao Paulo, which alone produces half the world's total of coffee; "this city, being its heart and centre, has risen in sixty years from a small country town to be a place of four hundred thousand inhabitants," Santos, which is the natural outlet for the coffee of Sao Paulo has thus been described : "In Santos coffee World absolutely dominates the lives of the people. Coffee is Trade in everywhere—on the streets, in the warehouses, on the Coffee. trains. Every one is busy with coffee. . ."¹ This enormous development of the coffee industry has been due to among other factors, to the richness of the volcanic soils around Sao Paulo. Other important coffee-producing states of South America are Colombia, Venezuela, Ecuador and the Guianas. More than three-fourths of the world's coffee comes from South America. Costa Rica in Central America and the islands of Jamaica produce high grade coffee. In Africa coffee has not yet made headway, though Kenya has made a name for her excellent coffee. In Asia there were large plantations in Ceylon and Southern India ; but most of these have long been destroyed because of a virulent

Production of Coffee

1953

(In Thousand Metric Tons)

Brazil	..	1,111	Sansalvador	..	60
Colombia	..	414	Mexico	..	81
Indonesia	..	130	Guatemala	..	66
Total World Production	..			..	2,430

¹ R. De, C. Ward, "Brazilian Country", National Geographic Magazine (of America), Vol xxii, p. 931.

disease attacking the coffee plants ; at present there are small plantations in those regions, and of these the plantations in Mysore are the most important. Java still has a fairly large production to her credit. On the seaward slopes of Southern Arabia the famous Mocha Coffee is grown in small quantities.

Importers.

The chief importers are the U.S.A. and the European countries, the former easily leading the rest in its consumption. Most of her supply is derived from the South American states, particularly Brazil. France, Holland, Sweden and Belgium are also great coffee-drinking countries, as the annual consumption per head in these countries show.¹ In the United Kingdom tea is more popular than coffee. Countries having colonies elsewhere generally import their coffee from their dependencies ; thus there is considerable trade in this commodity between the Netherlands and the Dutch East Indies. This also is another reason why tea is a greater favourite in the U.K. than coffee.

Conditions of growth.

Tea.—There is an interesting progressive specialization in respect of the localization of coca, coffee and tea—the three chief beverages of the world. Cocoa, as we have already seen, is essentially an equatorial product, coffee a tropical or sub-tropical plant, while tea can be grown both in the Tropics and in Warm Temperate Regions. The tea plant is said to be a native of south-east Asia, having originated somewhere in the uplands of South China, Indo-China, or India.² The fact seems to be that it is essentially a sub-tropical plant, requiring abundant seasonal moisture and an uniformity of relatively high temperature. These conditions are found in areas just outside the Tropics and governed by the Monsoon, *i.e.*, in Assam, Indo-China and South China. Moreover, it is one of the hardiest of the sub-tropical plants, and can, therefore, be acclimatized in relatively unfavourable climes. It has a far greater capa-

¹ Consumption per head in Holland is 19 lbs. annually, in Belgium 11, in Sweden 13 ; in the U. S. A. 12, in France 10, and in the United Kingdom only 2½lbs (See Chisholm's).

² Case and Bergsmark, College Geography, p. 225.

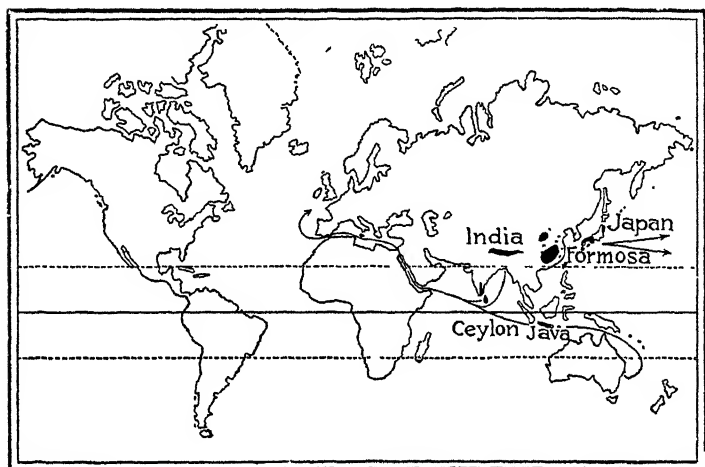
city to stand frost than has the coffee plant ; even the severe frosts of North China cannot kill it, though its yield is greatly diminished thereby. The plant has, therefore, easily spread out of its original home. But it would not grow in countries where the summer is short and cool. The tea plant requires a deep, fertile, well-drained soil, rich in humus. Virgin forest soil with light, friable loam containing a good supply of organic matter is ideal for it. The presence of iron in the soil is believed to be beneficial, and curiously enough most of the tea plantations are on soils remarkably poor in lime content.¹ A rainfall of at least 60 inches is essential but the best result is obtained when there are nearly 100 inches of rainfall during the vegetative season. Good drainage is essential, as stagnant water spoils the roots and yet there must be abundant rainfall. That is why hill slopes are always preferred for the cultivation of the tea plant. Left to itself the plant would sometimes attain a height of twenty-five feet, but in plantations they are kept down to a height varying from three to six feet by frequent pruning. It comes into full bearing in about 25 years. It is, like the cocoa and the coffee trees, an ever-green.

Tea, the finished product we call by that name, is not a seed or fruit, but is the dried leaf of the tree. The trees are pruned in the spring, and shortly after that operation young shoots appear ; when these attain a certain size they are picked by hand. Cultivation and picking both require much labour and careful work. That is why it is a productive crop in those sub-tropical lands which have abundant cheap labour. When the gathering is over, the leaves are spread over mats or trays and turned at short intervals so that they wither. The next operation is to roast them, or, as they say in the gardens, to 'fire' them in pans or kettles over charcoal fires. This causes the leaves to soften, and then they are rolled on tables by hand. Then they are given a second or even a third roasting. But the Japanese and the Yankees consume much green tea,

Preparation
of Tea.

¹ Chisholm's Handbook, p. 184.

which is merely dried over charcoal fires. Brick tea is prepared by compressing the tea dust, tea remnants and coarser leaves.



The Tea-growing Countries of the World.

Production. The leading producers are China, Ceylon, India, Java and Japan. Natal, Jamaica, Brazil and California also grow

Production of Tea (1953)
(In Thousand Metric Tons)

China	..	..	—	Japan	..	..	44
India	..	..	275	Pakistan	..	..	25
Ceylon	..	..	155	Kenya	..	..	6
Indonesia	..	..	36	Formosa	..	..	12
World's Total (1953)				..	..	..	580

some tea, but the output is quite small. The huge production of the East is due largely to the cheapness as well as regular supplies of labour. China is the biggest producer of tea, but the largest exporter is India ; Ceylon and the Dutch East Indies rank respectively second and third in export. Japanese tea is mainly green tea, and is grown chiefly for home consumption, although some of it is exported to the U.S.A. About four-fifths of India's output is grown in north-eastern India—the Brahmaputra Valley in Assam and the Duars region of Bengal ; the remainder

is grown in the Nilgiris in the southern part of Peninsular India. The development of the tea industry in Ceylon is partly due to the destruction of her once important coffee plantations. The Dutch East Indies may become a serious rival of Ceylon both in production and export.

Great Britain is the principal importer of tea, taking nearly half the amount brought into the international market ; she also re-exports some to other countries. The chief customer of India and Ceylon is, of course, Great Britain ; other consumers are Russia, France, the U.S.A., Canada and Australia. Russia takes nearly one-quarter of the tea exported from Asia. She is seriously trying to find out a variety that can be grown in her territories, and if the attempt comes out successful Asia's export trade will receive a great setback.

In South America is grown the maté tea, also known as yerba or Paraguay tea. It grows wild in the forests of Paraguay, and is now being cultivated in the plantations of Paraguay, Uruguay, Brazil and Argentina. But it has not yet entered into the international market ; the trade is restricted to the South American states.

Fruits and Wine.—Fruits which now have entered into the international market may be roughly classified into the following four types:¹

(a) *Tropical and Sub-tropical fruits*, represented by bananas, pine-apples and dates ;

(b) *Citrus fruits* like oranges, lemons, grapefruits and lime ;

(c) *Grapes and Wine* ;

(d) *Deciduous fruits*, such as apples, pears, almonds, peaches, apricots, nectarines, figs, plums and cherries.

(a) **Tropical and Sub-Tropical Fruits.**—The banana tree is a soft-stemmed plant with characteristically large leaves, and attain a height of eight to twelve feet. It is a tropical plant par excellence, and grows in humid climates.

¹ Stamp, A Commercial Geography, pp. 70-75.

It has several varieties, most of which are rather large plants, though there is a dwarf variety which it is possible to cultivate in the Temperate Zone.¹ This dwarf variety is now largely grown in the Canary Islands. Other varieties are grown in the Tropics. High temperature, an abundant supply of moisture, and a deep soil are essential for all the varieties. Where rainfall is not sufficient water must be supplied by means of irrigation. The plant is annual, but the root perennial. Bananas are grown almost everywhere in the Tropics. But the chief centres of commercial production are Central America (particularly, Costa Rica), Colombia, the Canaries, the West Indies and the Hawaiian Islands. The chief importers are the United States, the United Kingdom, and some of the European countries. Great care is needed to export the commodity overseas.

Pineapple The pineapple plant is said to be a native of America. A moist, fertile, but light soil is essential for it ; it thrives quite well on sandy soils as well on or near about seaboards. A warm tropical or sub-tropical climate is, of course, needed. It is a low-lying plant, very nearly stemless, and has long, stiff, sharp-pointed, fleshy leaves with the pine in the middle. From the point of view of international commerce it is far less important than banana. Fresh fruits are rare in the overseas trade. California, Hawaii and Singapore are the principal centres of export, and Europe is the principal customer mainly of canned pineapple.

Dates. Dates, as is well-known, are the characteristic product of the Hot Deserts. The date-plam has, however, been introduced into California and the drier regions of Spain. Iraq is the chief exporter, and Europe, as always, is the chief importer. Some dates are exported from Tunis in North Africa as well.

(b) **Citrus Fruits.**—As has already been said, the citrus fruits are essentially a product of the Mediterranean Regions ; but some of these thrive well in Warm Temperate and Tropical Regions also.

¹ Chisholm's Handbook, pp, 204-205

The orange is perhaps the typical of these fruits, or, Orange. at any rate, the best known of them. The orange tree is an evergreen with beautiful shiny leaves. Originally a native of China it has spread out in the Mediterranean lands, as well as in many of the Tropical and sub-tropical regions. It was introduced in Europe by the Portuguese about the middle of the sixteenth century. The bulk of North America's production comes from California and Florida. In South America the chief producers are Brazil and Tucuman (Argentina). The West Indies also have a fairly large output to their credit. Mexico in Central America may also be mentioned. In Europe the leading producers are Spain and Italy, with which Malta, Sicily and Portugal may also be mentioned. South Africa and Australia have also recently come into the line. In Asia, Iran, Palestine, India—and, of course, China are the leading producers. The oranges of Nagpur and the Khasi Hills have great reputation abroad. Those of Malta and the West Indies as well as of Tucuman are also well-known for their quality. Until recently Spain and Italy together with Palestine held a sort of monopoly in the orange trade. Now the United States leads the overseas trade with Brazil as the second largest exporter. But oranges can now be had at all seasons, mainly because of the production in the Southern Hemisphere.

Lemons are grown in all the continents, but the pro- Lemons. duction is largest naturally in the Mediterranean regions. Europe derives her supply mainly from Sicily. Grapefruit, hitherto restricted to the Mediterranean lands of Europe, is now cultivated in Florida, California, South Africa and Palestine. Limes require a slightly warmer climate, and are now largely grown in the West Indies.

(c) **Grapes and Wine.**—The grape vine is said to be Grape-fruit a native of the region to the south of the Caspian Sea. It seems to have spread naturally as far west as the Carpathians, on the one hand, and as far east as Afghanistan, on the other. It requires a good supply of rain but no excess of moisture, a well-drained or dry land, and a warm spell of dry summer for the ripening of the fruit. But

though eminently suited to the Mediterranean type of Climate, its cultivation has spread to regions having warm dry summers but not exactly a Mediterranean Climate. Thus the vine is extensively cultivated in France far to the north of the Mediterranean lands of Europe, in the Rhine Valley in Germany and as far as the Carpathians in Central Europe. This has been possible mainly because the grape has developed, or, has been made to develop, several varieties. Raisins are a variety of partially dried grapes ; so are also muscatels. These commodities are very important articles of international trade, and the chief producers are Spain, California and Asia Minor ; the Mediterranean regions of South Africa and Australia have also entered the market recently. Sultanas are also a kind of seedless dried grape, produced in large quantities in Turkey and the *Ægean* Islands ; these form one of the chief exports of the port of Smyrna or Ismir. Currants are another variety of seedless dried grape produced mainly in the Levant ; formerly the export of this commodity was practically a Greek monopoly.

Wine. Wine is actually fermented grape juice. It, too, has many varieties. For the preparation of the so-called 'sweet wines' the grapes are collected when about three-quarters ripe, and the sugar is allowed to ferment only partially. For the preparation of the 'dry wines' the whole of the sugar content is made to ferment. There are various processes of wine manufacture,—each more or less a commercial secret ; moreover, the character of wine is said to differ markedly owing even to slight differences of soil and climate. That is why the various types of wine show unmistakable local preferences. Thus the manufacture of Port is localised in the upper Douro Valley in Portugal ; Sherry in the Jerez region of Spain, Champagne in the dry chalk hills of the Champagne district in France ; Burgundy comes from the slopes of the Côte d'Or, France ; Claret from the Bordeaux region in France ; the Moselles are localised in the Moselle Valley ; the White Hocks in the Rhine Valley ; Chianti is an Italian wine ; and so on. France is the largest producer of wine in the world, and yet she has to import large

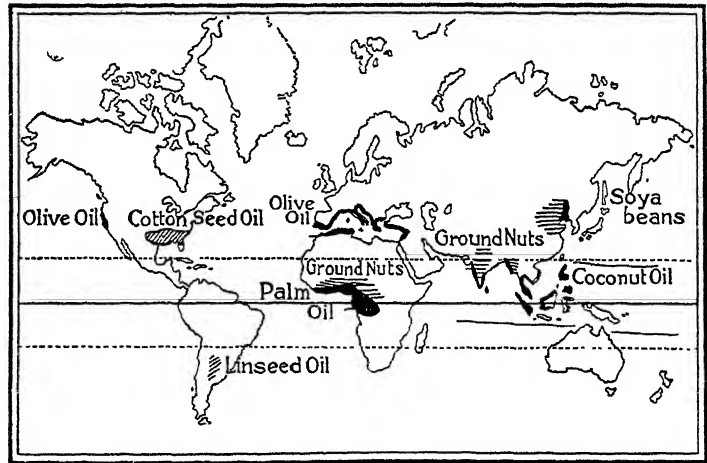
quantities from abroad, particularly from North Africa. This is mainly due to the great demand of French wines in other countries. Italy is the second largest producer, but Italian wines are said to be 'sharp'. Spain and Portugal rank third and fourth respectively in production, and the Spanish Sherry and the Portuguese Port are said to be of the very best quality. Wine has aptly been called 'the national drink' of France, Spain, Portugal, Switzerland and Italy, as well as of Latin America.¹

(d) **Deciduous Fruits.**—These are the fruits of the deciduous trees, and include figs, apricots, peaches, nectarines, almonds, olives, etc. Of these olive is an evergreen. It is said to be a native of Asia Minor, and is practically restricted to the Mediterranean lands. It is valued both as a fruit and for obtaining olive oil. The chief olive-producing countries are Spain, Portugal, Italy, Greece and Tunis. Olive-oil, besides being used in cooking, lighting and medicine, is used in the manufacture of soaps. Italy, Greece, Tunis and Algeria are the chief exporters. Nuts are exported from the wetter parts of Mediterranean lands as well as from Brazil. Fruits of all sorts are coming more and more into the international market.

Oil-seeds and Vegetable Oils.—Vegetable oils have many uses ; for human consumption margarine or artificial butter is made from them ; they are required in the manufacture of soaps, candles and various other toilet preparations. Of these olive oil is perhaps the most important. In the countries of Southern Europe it is extensively used as a substitute for butter and animal fat. Where, again, olive oil is difficult or more expensive to obtain, ground-nut oil is used as a substitute of that substitute. This is especially the case in the drier regions of China, India

¹ Stamp, A Commercial Geography, p. 74. It may be interesting to compare the wine-drinking countries with the beer-drinking countries. To the latter group belong Germany, United Kingdom with Ireland, Netherlands and Belgium. Roughly speaking, wine is popular among the Latin races, and beer among the Teutonic races. Brandy and whisky are also popular in Great Britain.

Palm oil and West Africa, where various ground-nuts are largely grown. These nuts thrive well on sandy soil with scanty rainfall, unsuitable for any other crop of commercial value. The oil-palm, which grows in the Equatorial Regions and their neighbourhood, yield an abundant supply of palm oil. It is extensively used in the manufacture of soap and



Vegetable Oils.

candle, as well as of artificial butter. It is cultivated in Malaya, Sumatra, and Equatorial Africa. Nigeria is the leading exporter. The coconut palm is a tropical plant, thriving well on a sandy soil, particularly in maritime regions. From it is obtained coconut oil and copra. Both the products are commercially very important. Besides, the fibre is used in making mattresses. The principal exporters are the Dutch East Indies, Malaya, Phillippines, Pacific Islands, Ceylon and India. The chief importers are the U.S.A., the U.K., the U.S.S.R., Germany and France. The soya bean, which is almost a Manchurian novelty, is also an important source of vegetable oil. Manchuria is practically the sole exporter, and the U.S.A., and Japan are the chief importers. The U.S.A., has been trying to produce it at home for some time. Of various other vegetable oils those obtained from rape-seed, sesamum, linseed and cotton-seed may be mentioned here. India at present holds a sort of

Coconut
oil and
Copra.

Soya bean
oil.

Other oil
and seeds.

monopoly in rape-seed oil ; sesamum oil is exported chiefly from India and China. Linseed comes from Argentina and India ; it is obtained from the flax plant, but in Northern Europe the plant is grown mainly for the fibre, not so much for the seed or oil. Cotton seed and its oil is obtained from the great cotton-growing countries like the U.S.A., Egypt, India, China and the U.S.S.R.

Spices.—Most of the spices are equatorial and tropical products. Pepper is shipped to Europe mainly from Malaya and the East Indies ; ginger from south-eastern Asia including China, as well as from Jamaica ; cinnamon from Ceylon ; cloves from Zanzibar ; vanilla from Java, Madagascar and Reunion ; chewing-gum from Mexico.

Pepper,
Ginger,
Cinnamon,
Cloves,
Chewing-
gum

Tobacco.—The tobacco plant is a native of tropical America ; but it has a very wide range ; it flourishes at the Equator, within the Tropics and even at the fringes of the Temperate Zones. The type and flavour of the prepared product, however, vary with the soil and climatic conditions. And yet the plant is very sensitive to frost. It requires a light soil rich in humus, lime and potash, and is an extremely exhausting plant. It exhausts the fertility of the soil in three or four years, and formerly plantation had to be abandoned frequently for new areas ; now-a-days the use of fertilizers has appreciably minimized this drawback. Tobacco is prepared from the leaves of the plant. The leading producers are the U.S.A., India, China, the U.S.S.R., and Japan ; while Philippines, Dutch East Indies, Brazil and most of the European countries as well as certain African states produce quite large quantities ; it is grown also in Canada, Scotland, and the Baltic states. Majority of the countries grow it mainly for home consumption, and yet large quantities come into the international market. The chief exporters are the U.S.A., Cuba, the Dutch East Indies, Brazil, Greece, Bulgaria and Turkey. The chief importers are the United Kingdom, France and Germany.

Conditions
of growth.

Production.

World
Trade.

III. Foodstuffs of Animal Origin

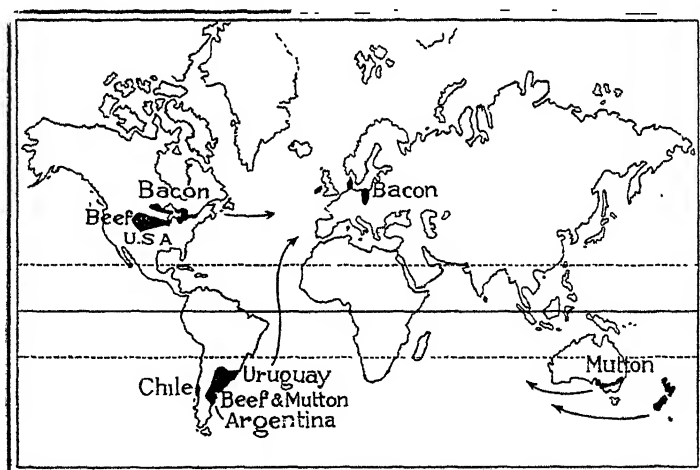
Meat.—Meat is an important article of human consumption in many parts of the world. Of the meats thus

Beef,
mutton and
pork.

Beef.

N. America

used beef, mutton and pork are of chief importance, although the flesh of many other animals is also utilized in greater or lesser extent. It is, however, of little use here to take into account the number and distribution of cattle, sheep and pigs as that is no sure indication of meat production. In India, for instance, cattle are kept in large numbers, not for meat, but mainly for ploughing, dairying and draught purposes. In many other countries they are kept not at all for draught purposes, but for meat and the dairy products. 'Beef cattle', requiring much less attention and care than their more aristocratic and lucky brethren, the 'dairy cattle', are concentrated in the great Mid-latitude Grasslands of the world. In the drier western parts of Central Plain of North America, too dry for crops, there are enormous cattle ranches ; thence the cattle are sent to the Corn Belt where they are fattened on maize before being sent to the slaughtering houses of Chicago. Here the meat is packed for the market. Though one of the biggest of the meat-producers, the U.S.A., does not export much



The Meat-producing Countries of the World

S. America.

beef or any other meat. Another big beef-producing area is in South America ; it is the River Plate region comprising much of Argentina, Uruguay, Paraguay and a small area of Brazil. Cattle is also reared in Chile. But

the Plate region, particularly Argentina, is the largest beef-exporting area in the world. But in both the Americas the steady extension of agriculture, mainly of wheat, has been restricting the cattle ranches. The chief importers are the countries of north-western Europe, particularly the United Kingdom, because local supplies there are not sufficient.

As there are 'beef-cattle' and 'dairy cattle' so also sheep are either 'mutton sheep', or 'wool sheep', or even 'milk sheep.' Sheep can subsist on pasturage, too small for cattle; hence they are the most widespread of all the animals raised in the semi-arid regions of the world. The greatest concentration of sheep are in New Zealand, South-Eastern Australia including Tasmania, South Africa, South-Eastern Europe and Italy, Great Britain, and Argentina. The United States and Russia, as well as Spain, France, Central Europe, Northern Africa, East Africa, India, Central Asia, though they contain large numbers of sheep, are relatively unimportant in number per square mile. In the international market New Zealand easily ranks as the chief exporter; the South American states like Argentina, Uruguay and Chile together rank second, and Australia comes third. By far the greatest importer is Great Britain, although mutton sheep are said to be best raised there.

Swine do not require the range that is essential for cattle and sheep, and are, therefore, easily raised in large numbers in densely populated areas. In Europe they are often fed on nuts, acorns, sugar-beet residue, etc., in America corn or maize and alfalfa are their chief food. Swine are omnivorous. The chief hog-raising countries are China, the U.S.A., North-Western and Central Europe, Brazil and Argentina. The meat is exported in various forms, particularly as bacon and ham. The largest exporters of bacon are Denmark, Canada, Poland and Ireland. As usual Great Britain is the principal importer. The U.S.A. exports a large amount of lard (melted pig-fat) to Britain.

Dairy Produce.—Milk, butter and cheese are the three principal dairy products. Milk is obtained from vari-

ous animals like goats, sheep, buffaloes, camels, reindeer and asses, besides the cow ; but that of the cow is by far the most important. There is no international trade in fresh milk, and even in inland trade the centres of supply are in close proximity to the areas of consumption. The possibilities of cold storage have, however, recently made it possible to carry on international trade in fresh milk within limited areas, and some quantities are now coming to Britain from the European continent. Another method is to trade in spray-dried milk, which is said to be exactly like fresh milk when prepared at home for consumption. The best known method is, however, to export condensed milk.

Butter. Butter is kept fresh much more easily, and the international trade in it is consequently much more extensive. The chief exporters of butter are Denmark, New Zealand and Australia. The principal importer is Britain.

Cheese. Cheese, which has many varieties, is also easy of export. The leading exporters are New Zealand, Holland, Canada and Italy ; the principal importers are the British Isles and the states of north-eastern Europe.

Poultry.—The poultry trade is not of much international importance yet ; but the trade in eggs has a larger field. China is the largest exporter. Denmark and Ireland also export large numbers of fresh eggs. Over long distances eggs are sometimes sent in an extracted condition.

Fish.—The two sources of fish are (a) fresh water, and (b) the sea. Fresh-water fish is found in rivers, lakes and artificial water like ponds. They are important only for local consumption and inland trade over comparatively small distance. It is very interesting to note that all the major fishing grounds are located in the Temperate Zone of the Northern Hemisphere. Why is this so ? The tropical waters are by no means devoid of fish ; on the contrary, the tropical fish are noted for their variety and beauty. But they are mostly unpalatable and softer, and they are said to spoil much more easily than do those found

in middle and higher latitudes. Moreover, there are varieties of tropical fish that are said to be more or less poisonous. In the temperate waters there are fewer varieties, but most of them are said to be edible and wholesome. That the major fishing grounds are in the Northern Hemisphere is explained by the fact that the land masses here are far greater than those of the Southern Hemisphere. It is important to note that *the fishing grounds are within a few hundred miles from the coasts.* They lie partly on the shore-belt of shallow waters covering the continental shelf or submerged continental platforms; others are located in the elevated parts of the sea floor some distance from the shore, as the famous Dogger Bank in the North Sea. Fish live upon the plant life and tiny insects of the sea. The plant life of the sea is distributed mainly in (a) shallow coastal waters, and (b) the surface waters. Rooted plants are almost entirely restricted to the shallow coastal waters, as sunlight does not penetrate to great depths in the sea. The plants which float on surface waters are of microscopic types; these have the power to transform the salt of the sea and the air into organic substances by the help of sunlight. Upon these live myriads of minute sea animals and fish spawn, and the whole forms a sort of reservoir of fish food.¹ Moreover, in the shallow waters are deposited the waste of the land by the rivers, and these also supply abundant fish food. Again, the shallow waters are excellent spawning grounds for fish. No plant life has yet been found in the abyssal deeps; yet they are by no means devoid of animal life, and certain creatures caught in the net from those great depths are certainly fish. But they are by no means edible. Used to the enormous pressure of the ocean waters many of them explode as soon as brought to surface waters or the land. The location of the major fisheries in the North Temperate Zone has also been ascribed to economic and commercial factors; they are found along the coasts of densely populated regions where there is great demand for the commodity and hence ready markets are available.

Tropical
vs.
Temperate
fish.

Shallow
waters are
chief
fishing
grounds.

Reasons
therefor.

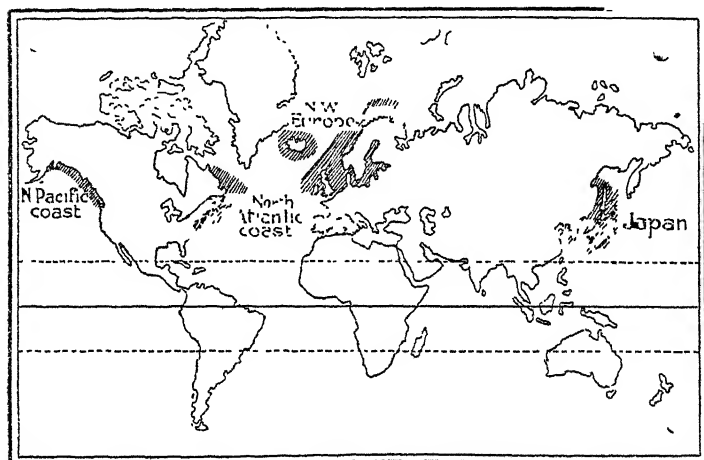
Reasons
for location
in North
Temperate
Zone.

¹ Rodwell Jones, "The British Fisheries", Economic Geography, Vol. II, p. 71.

Moreover, it is less difficult to preserve fish in the temperate lands than in warmer countries. The major fishing grounds of the world are :¹

Major
Fishing
grounds.

(1) **The North Pacific Coast** of Canada and the U.S.A. The principal catch are salmon, cod, halibut and



The Major Fishing Grounds of the World

herring. The salmon comes up the river mouths and creeks during the spawning season, and large numbers are then easily caught in Alaska, British Columbia and the adjacent areas of the United States. Despite the enormous number of fish in the sea, long-continued and destructive methods of fishing have considerably reduced the number, especially of those that come up the rivers to spawn. The U.S.A. government has, therefore, established department for the scientific study of the fishing industry and to encourage breeding.

(2) **The North Atlantic Coast** of Labrador and Newfoundland, including the Great Banks, Canada and the New England states of the U.S.A. The principal catch are cod, haddock and herring ; there are also large fisheries

¹ Stamp, A Commercial Geography, pp. 81-83.

along the coast (in-shore) for lobsters and shell-fish. This is topographically an ideal fishing ground, based, as it is, on a splendid combination of rivers, bays and shallow off-shore banks.

(3) **The Coasts of North-Western Europe**, which extend from the North Cape along the North Sea and round the British Isles to the northern parts of Africa. The fisheries round Iceland may also be included into this area. It is in all probability the largest fishing ground in the world.

(4) **The Coasts of Japan**, where the principal catch are herring, haddock and sardine, as well as several other species of fish not to be found elsewhere.

Of these the fisheries of Japan easily rank first in the Trade. number and value of catch per year ; this industry in Japan gives employment to nearly 1½ million people. But the Japanese fishing products are mainly for home consumption ; export trade is, therefore, small and relatively unimportant. The United Kingdom is sometimes given U. K. the second place as regards her annual catch, though the place is contested for by the United States with Alaska. The fisheries of the United Kingdom are said to employ above eighty thousand men, and it has been estimated that the whole fishing industry gives actual employment to about double the number all told.¹ She is one of the biggest exporters of fish, especially of herring. Norway is another great fishing country, employing about a hundred thousand men for at least a part of each year.² She is a great exporter, too. The U.S.A. with Alaska and Canada with Newfoundland are also great exporters of canned fish. Canned salmon is said to represent more than half the value of the total output of canned fish. By far the greatest fish-exporting region in the world is, however, North-Western Europe, and the greatest importer is Southern Europe, especially of dried fish. In exchange for

Japan.

Norway.

Export and
Import
between
N. W
Europe
and South
Europe.

¹ Chisholm's Handbook, p. 235.

² Case and Bergsmark, College Geography, p. 533.

Other
Countries

Oysters.

the fish from N. W. Europe wines, citrus fruits, olive oil and other Mediterranean products are supplied by Southern Europe. Spain, France, Germany, Russia, East Indies, Australia and other places are also fishing countries ; but in these countries the industry is of much less importance. In the export trade dried and cured cod and herrings are of foremost importance.

Apart from fish, the fishing of oysters is a very important industry. In this North America leads, with France following immediately behind. They are obtained from both natural and cultivated beds. But China has been cultivating oysters for thousands of years.

Origin.

IV. THE RAW MATERIALS OF THE TEXTILE INDUSTRIES

Conditions
of growth.

Cotton.—Logically speaking, the clothing of man comes immediately after food, although in actuality both are of equal importance. Of the various raw materials used in clothing man, cotton is by far most important. It is a fibre obtained from the seed of a plant of the pod-bearing genus or order. When the pod or boll ripens it bursts open, we get the fibres or hairs which encompass the seeds therein. Raw cotton is obtained by 'ginning' *i.e.*, by separating the hairs from the seeds. The cotton plant has a remarkable climatic range. A rich, light, well-drained, salty soil, capable of retaining moisture is ideal for it ; but it thrives surprisingly well on moderately poor soil also. Plenty of moisture is essential during the growing season, and a hot, moist, but not saturated atmosphere until the buds appear ; this must be followed by a dry sunny season till the pods are fully ripe. When the pods burst open rain is harmful to the seed fibres. Sea breezes are extremely wholesome to the cotton plant. It is basically a dry-zone plant that tolerates moisture in the soil but not in the atmosphere. It does not flourish in areas having a rainfall of over 40 inches a year. But in many places water is to be supplied to its soil by irrigation as in Egypt,

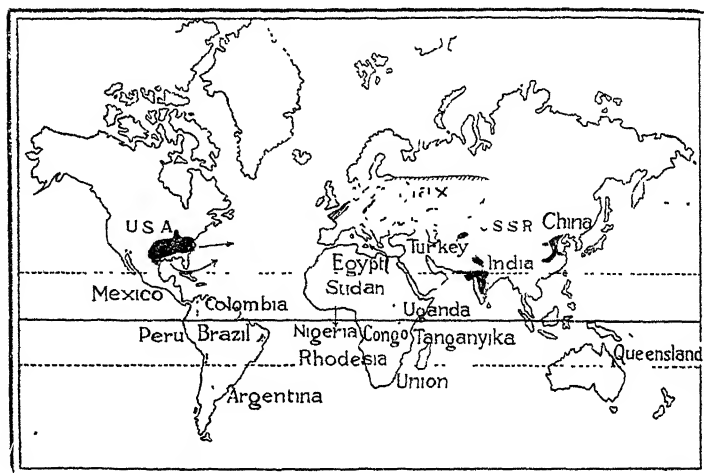
Peru, the U.S.A., and parts of India. Most of the Indian cotton is, however, grown in areas having a rainfall between 20" and 40". It can never grow in Equatorial Regions. Stamp locates the potential cotton lands of the world between 43°N and 30°S. It is grown as an annual in most places.

Production of Raw Cotton

(American in running bales ; others in 478 lbs. net bales)

Countries	Average 1935-39	1950
America		
U. S. A.	13,150,000	15,970,000
Mexico	334,000	960,000
Brazil	1,956,000	1,380,000
Peru	384,000	320,000
Argentina	289,000	600,000
Asia		
China	2,100,000	1,000,000
India	4,850,000	2,300,000
Pakistan	—	1,020,000
U S. S. R.	3,430,000	2,700,000
Europe		
Greece	—	72,000
Italy	—	9,000
Spain	—	15,000
Africa		
Egypt	1,900,000	1,805,000
Anglo-Egyptian Sudan	248,000	305,000
Uganda	281,000	280,000
Tanganyika	50,000	45,000
Belgian Congo	172,000	245,000
Oceania		
Australia	10,000	1,000

Production. The important cotton-producing countries are the U.S.A., India, China, the U.S.S.R., and Egypt ; lesser pro-



The Cotton Lands of the World.

U. S. A.

ducers are many—Mexico, Colombia, Brazil, Peru, Argentina, Sudan, Nigeria, Uganda, Pakistan, Rhodesia, S. Africa, Tanganyika, Queensland (Australia) etc. The United States is, however, by far the greatest producer of cotton, with about half the world's total output. Nearly all its cotton is grown in the great and famous Cotton Belt of the south-east. India ranks second in order of production ; the bulk of her output is from the Deccan lavas region, that fertile tract of volcanic black earths, and the adjoining territories ; another 'cotton belt' of India extends roughly from the western half of the so-called U.P. to the Punjab ; this is seen on the map to touch the cotton fields of Central India on the left flank, and may be regarded as continuous with the great fields of the Deccan lavas region. There are lesser fields in various other places like Cutch, Rajputana and the so-called Northern Circars region of the Madras Presidency, and still lesser fields in Bihar and the south-eastern borders of Bengal adjoining the Lushai hills region of Assam. But Indian cotton is of poor quality—coarse and short-stapled.

India.

Egyptian and Sudanese cotton is the best, but the output in the narrow Nile Valley and the relatively undeveloped Sudan is small. In China the principal producing areas are the Great Plain of the North and the valleys of the Hwang-ho and Yangtse river. The whole of the crop is generally used at home.

Raw cotton is usually classified into the following four grades¹: Grades
of cotton.

Grade I, distinguished by staples above $1\frac{3}{8}$ inches long and a very fine silky texture. This is the famous 'Sea Island Cotton' grown in the West Indies. It is pre-eminently a *long-stapled cotton*. Attempts are now being made to introduce this variety in the mainland of North America, particularly in Georgia and Florida. This variety is grown on lowlands. The seeds of this cotton were originally brought from Egypt, and the best varieties of Egyptian cotton as well as those of the Sudan and Arizona belong to this group.

Grade II, with staples above $1\frac{1}{8}$ inches. This is sometimes (as in the U.S.A.) styled long-stapled, but should better be described as *medium-stapled*. The bulk of the Egyptian, Peruvian, North Brazilian and East African (Uganda and Tanganyika) cotton belong to this group. It is wrong to style it precisely as 'Upland cotton,' as some writers are inclined to do. If, however, such an indefinite name is at all to be used in this connection, one must look upon this type as well as that belonging to grade III as a variety of '*Upland Cotton*'.

Grade III, with staples carrying from $\frac{7}{8}$ inch to $1\frac{1}{8}$ inches. To this group belong the bulk of the world's total output of cotton, including most of the cotton grown in the U.S.A., Brazil (especially in the Sao Paulo region), Argentina, the U.S.S.R., and part of the Chinese and African crops as well as a third of India's output. These are decidedly short-stapled, but there are varieties even

¹ From Stamp.

shorter than these. In the U.S.A. these varieties are also known as '*Upland Cotton*'.

Grade IV, below $\frac{7}{8}$ inch, to which belong the bulk of the Chinese and other Eastern and Near Eastern crops, as well as the remainder of American and Indian cotton. These are certainly *short-stapled*, and commonly of poor quality.

More than half the world's total output of raw cotton enters into the international market. The trade is mainly between the tropical and warm temperate countries which grow it and the manufacturing countries of Europe, America (U.S.A.) and Japan. The U.S.A., grows much more cotton

Export of Cotton (Percentages to the Total)			Import of Cotton (Percentages to the Total)		
U. S. A.	..	60	Japan	..	35
India	..	12	U. K.	..	25
Egypt	..	12	France	..	15
Pakistan	..	9	Germany	..	10
Others	..	7	Others	..	15
Total	..	100	Total	..	100

than is required for its own manufacture, and the principal part of the export of raw cotton goes to Britain. India is the second largest exporter. Next comes Egypt and other exporting countries are Pakistan, Brazil, Peru and Argentine. The importing countries are United Kingdom, Japan, France, Italy, Germany, Holland, Belgium etc.

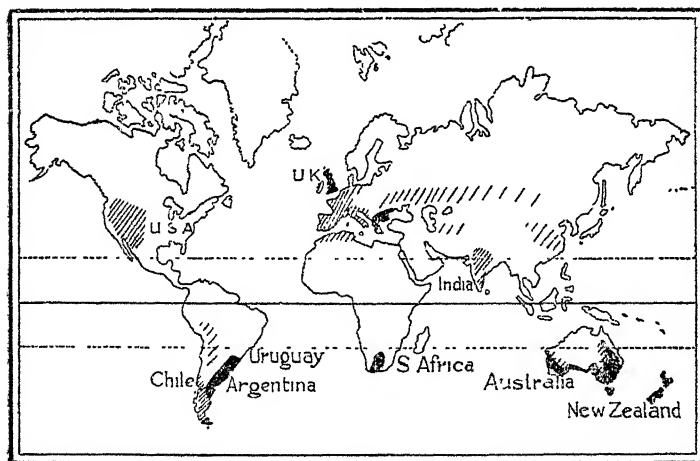
Conditions
of
Production

Wool.—Wool is of animal origin, obtained mainly from sheep. The animals reared in a cool dry climate give the best wool ; but the climate must not be too severe in winter. That is why the largest wool-producing regions are in the Temperate Grasslands of the Southern Hemisphere ; for the Temperate Zone Grasslands of the Northern Hemisphere suffer from too severe a cold in the winter because of the greater extent of the land masses there. Regions with a rainfall between 10 and 30 inches are ideal for sheep. Sheep kept in moist regions are very liable to

suffer from certain diseases. This can, however, be prevented by providing suitable drainage conditions. The yield, as is only natural, varies from one type of sheep to another. There are also several grades of wool, varying chiefly according to the age of the animals. Thus the wool obtained from lambs seven months old is the finest.

The leading wool producers are New Zealand, Australia, South Africa, the Black Sea region of Europe, United Kingdom, Argentina, Uruguay and Chile; the U.S.A., Spain, France, Northern Africa, Asia Minor, Russia, India and China are lesser producers of various grades. The grasslands of the Southern Hemisphere together contribute nearly two-thirds of the world's output; in this Australia ranks first, with New Zealand and Argentina closely following as second and third respectively; South Africa comes to occupy the fourth place, and the contribution of Uruguay is by no means quite small. There are large numbers of sheep in the United Kingdom and Ireland, and the produc-

Output.



the wool producing countries.

tion of wool is not inconsiderable, although the British Isles are rather damp and the production of mutton is nearly as important there as that of wool. This is due to two reasons: many of the wool sheep are reared there in areas of comparative aridity, and where rainfall is abundant good

drainage is not rare. Russia's output of wool is quite large, but it is used almost entirely for home consumption. The U.S.A., though possessing a large number of sheep, is behind Russia both in the number of sheep and in wool production. India and China possess numerous sheep, but the wools are poorer in quality and are used mainly for the manufacture of carpets.

Other
wools.

Other animals providing man with wool are goats, camels, the alpaca, the llama and the vicuna. Mohair is goat's hair, supplied largely from South Africa and Turkey. Another species of goats, ranging over the mountainous regions of the Himalayas, Tibet and Southern China, provide a fleece known as the Cashmere wool ; it is of very fine quality. Alpaca, a type of wool obtained from the animal of that name, is a nice shiny type of wool, supplied from the Andes region of S. America. So are also the wools gathered from the llama and the vicuna. The vicuna wool is said to be the finest of all textile materials.

Conditions
of
Production.

Silk.—The silk worm is not really a full-grown worm, but the caterpillar stage of several types of moths. It feeds upon the leaves of the mulberry tree, though sometimes other leaves, such as those of the oak and osage-orange, are sparingly used. When nearing the chrysalis stage the caterpillar sends out some soft material from the two minute apertures in its head, and this material hardens after coming in contact with air. The caterpillar then lies in a torpid state completely enveloped in the cocoon thus made. It is then that the cocoon is to be picked up and the poor worm destroyed by being dipped into warm water, and the silk obtained from the cocoon ; otherwise it would on waking up cut through the cocoon as the imago or butterfly. The silk moth seems to be a tropical or sub-tropical insect. The average cocoon is about an inch long and contains from 300 to 500 yards of silk thread.

About 85 per cent of the world's output of raw silk is produced in *China* and *Japan*. China is the largest producer of raw silk. Sericulture was first practised in China probably four thousand years ago, and as a producer of silk

that country still ranks highest with nearly $2\frac{1}{2}$ times as much silk as the rest of the world put together. But as an exporter her share is relatively small. Japan is the leading exporter ; silk is her most valuable export, and sericulture is second only to rice culture among her industries ; of all the silk of commerce Japan alone contributes four-fifths or a little more. Other important silk-producing countries are India, French Indo-China, Korea, Syria, Turkey, Italy and France. Much smaller quantities are produced in Turkistan, Spain, South-Central Europe and the U.S.A. Italy also has a fair share in the export trade. The principal importers are the U.S.A., France, Italy and Switzerland. The U.S.A. now manufactures more silk than does any other country, but also imports large quantity of silk goods from the important manufacturing countries, particularly from France.

Production
and
Trade.

Artificial Silk.—In recent years rayon or artificial silk has become much more important than raw silk. It is produced from cellulose—wood pulp, sawdust, cotton waste, etc. The leading producers are the U.S.A., Japan, U.K., Germany, Italy, Belgium etc.

Source.
Production.

Flax.—The flax plant seems to have originated in the region lying between the Caspian Sea and the Persian Gulf. The plant has now been made to spread out to other regions because of its importance, and has, therefore, a wide range. It is a simple little plant attaining a height of about 2 feet only. But it is a very exhausting plant for all that, requiring a clean, well-drained heavy soil and successive crops of flax cannot profitably be grown on the same field. The plant is an annual, and in many places the same fields are planted only once in eight or ten years. It thrives best in places free from excessive heat and draught. A humid atmosphere is best for it. Though the plant is grown in the Tropics, it is best cultivated in the cooler parts of the Temperate Zone. In the Tropics it is grown mainly for seed ; in the cool Temperate Lands almost exclusively for its fibres. When the seed is in the dough and the leaves are just beginning to turn yellow, the plants

Conditions
of Growth.

are pulled up by the roots. The fibres are found in bundles around a central woody core, and the outside of the plant has a soft cellular sheath. Flax is spun into thread and is widely used for the manufacture of linen cloth. It is also used in making twine, cordage and canvas.

By far the greatest flax-growing region of the world is in the plains of Northern Europe, forming almost a continuous 'belt' from Northern France through Belgium, Germany and the Baltic States to Russia. Russia, with the Baltic States, produces about four-fifths of the world's total flax. But Belgium grows the best fibre. Lesser producers are Northern Ireland, Northern Italy, Japan and Canada.

Use. **Jute.**—Jute is the cheapest of all fibres, and ranks third so far as fibre production of all sorts is concerned ; it is a close competitor of wool, but both wool and jute fall far behind cotton in this respect. Jute is used not so much for clothing as for the manufacture of cord, twine, canvas and wrappings. The jute plant is essentially a tropical fibre crop ; but it is restricted almost entirely to the Lower Gangetic plain of India. It requires a rich alluvial soil, high temperature and heavy rainfall. The plant, like flax, is an annual. An well-drained soil is ideal for its cultivation, but the plant thrives well in muddy swamps, too. The quality of the fibre and the yield per acre depend in large measure upon the preparation of the soil ; the ground should be ploughed about four times and all weeds removed before the seeds are sown.

Besides the Gangetic delta which is the jute land of the world par excellence, it is grown to some extent in Ceylon, Southern China, Formosa and Malaya. But the output of all these countries put together is only one-tenth of the total jute of the world, and the huge remainder is the contribution almost entirely of the Gangetic delta. Small quantities are grown in the adjoining areas of Assam and Behar. Pakisthani and Indian jute is exported mainly to the United Kingdom, Germany, U.S.A., and France. Lesser importers are Canada, Japan, Italy and Argentina.

Other Fibres.—Jute has several rivals, the chief of which are the different varieties of hemp. Of these Russian Hemp. hemp is perhaps the best, though nothing like jute has yet been discovered or invented. Russian hemp is, however, not wholly Russian, but is grown in other parts of Europe as well. The plant is an annual, requiring a mild climate and humid atmosphere. It thrives best in loamy soils capable of retaining moisture. It is largely used in the manufacture of cordage. Manila hemp, exported mainly from the Philippines, is also extensively used in rope making. Its fibres are, however, harder than those of Russian hemp. Sisal hemp, another hard fibre, is grown in Kenya, Tanganyika and Mexico. New Zealand hemp, which, in fact, is a kind of flax, can be used for textiles. 'China China Grass' is another type of fibre, grown extensively in China, Grass. and can be woven into the so-called 'grass linen' fabrics. Kapok is a light and waterproof fibre ; though difficult to Kapok. weave, it seems to have a fairly prosperous future.

V. OTHER VEGETABLE MATERIALS

Timber.—After food and clothing the universal need of man is for shelter. But he cannot work in the vacuum ; so raw materials again are essential. Moreover, most of his activities are guided by these three primary needs, and though one of these may be assigned a logical priority over another, actually all of these needs run parallel courses.

Timber may conveniently (though not scientifically) be classified into three groups : (i) *Coniferous Softwoods*, Types of (ii) *Temperate or Deciduous Hardwoods*, and (iii) *Tropical timber*. or *Evergreen Hardwoods*. The principal varieties or species of coniferous softwoods are pine, firs, spruces, larches, cypresses and junipers. Temperate Hardwoods are represented by oak, birch, beech, maple, ash, walnut and elm. Tropical Hardwoods are teak, mahogany, ebony, rose wood, dye wood, etc. The sources of these woods have already been indicated in a previous chapter.

Of the total timber used by man nearly 80 per cent is softwood from the great Coniferous Forests, while of the remaining 20 per cent of hardwood about 18 per cent is obtained from the Temperate Forests and only 2 per cent from the Tropics including the enormous Equatorial Rain Forests. This disproportionate use, dictated, no doubt, by the primary needs and conveniences of mankind, has, however, led to serious complications ; it has resulted in a rapid depletion of the Coniferous Forests of several regions, and an attendant shortage of softwoods in many countries. Canada and the United States once had vast stretches of Coniferous Forests, especially the former which was noted as 'the Empire's storehouse of softwood supplies.' Consequently lumber industry was enormously developed in the regions of British Columbia, Ontario, Quebec, Northern Prairie provinces and New Brunswick. The U.S.A. has two important softwood belts,—one in the east including New England, the Appalachian Highlands and the Atlantic coastal plain: the other in the west located in the Rocky mountains and the Pacific slopes. The lumbering industry in Eastern Canada centres round Ottawa, but there the rapid depletion of the giant trees has necessitated a change of forestry in the shape of exploitation of the smaller trees for the wood-pulp industry, and hence the logging industry has naturally shifted to the west, particularly to British Columbia. The same story has also been repeated in the United States. The larger trees and forests in the Lake States, New England and the Gulf States have very nearly been wiped out, and the logging industry has gone over to the north-western Pacific States. Already there exists a shortage of soft-woods in Canada and the U.S.A., and steps are now being taken to study the possibilities of tropical forestry and the conservation of forests. The story is much the same in Europe as well, where the larger trees from most of the forests have disappeared. The existing forests of Norway are now a poor apology for what they were in the past. These alarming prospects have led the Scandinavian countries to guard this important source of national wealth quite zealously. The supplies of

Output
and use

Soft-
woods.
Result.

Canada.

U. S. A.

Europe.

softwoods from Sweden and the Baltic States are, therefore, regulated by law and are consequently strictly limited. It has now been recognized that forests are not to be used as mines but rather as natural crops. France, Germany and other countries of Central Europe are now carrying on scientific forestry in order to ensure a steady supply, and recently Great Britain has also come into line. The largest reserves of softwood conifers now are those of Northern Russia in Europe and Siberia in Asia. As already explained in a previous chapter, the countries of the Southern Hemisphere are very poor in softwoods of the coniferous type ; only New Zealand has a limited supply of Kauri and Rimu pines, while Southern Brazil and Southern Chile have a still lesser supply of indigenous softwoods. Recently, however, pines have been introduced in South Africa and Australia.

Russia.

New
ZealandBrazil
and Chile.

Australia.

The important centres of temperate hardwoods are in the Appalachian region of the U.S.A., Patagonia, Chile, the Alps, the Pyrenees, Central Russia, the Middle region of Siberia, Japan and Australia. The oak is the most important of these woods ; but several of the eucalyptus trees of Australia yield excellent timber. These latter have been introduced in many parts of the Northern Hemisphere. China certainly was an important centre of temperate hardwoods ; but the Chinese have completely wiped out the forests from the plains.

Temperate
Hard-
woods.

The Tropical Forests here include those found within the entire Torrid Zone, and can, therefore, be grouped as (a) Equatorial Forests and (b) Tropical Forests proper. The extent and other peculiarities of both the regions have been described in a previous chapter. Of the principal forest products teak comes almost entirely from Burma and Siam, and mahogany from Central America and West Africa.

Tropical
Hard-
woods.

Wood Pulp.—The timber industry goes almost hand to hand, in the Coniferous Forests especially, with the wood pulp industry. Of the total output of paper about nine-tenths is made from wood pulp, and the rest from a variety

Wood
pulp and
paper.

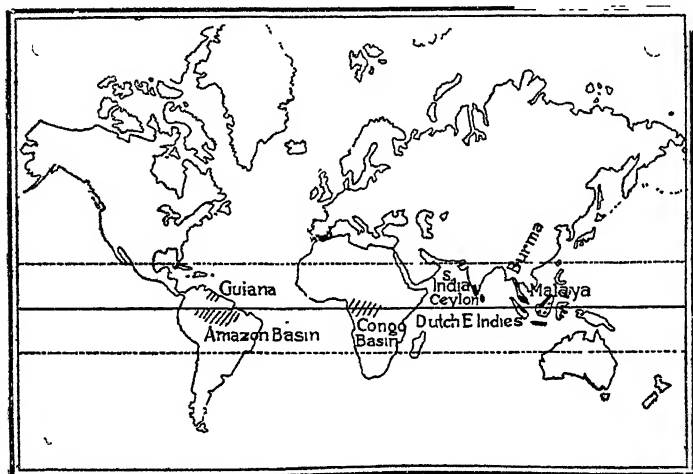
of vegetable products already mentioned in appropriate pages of the book. All these products are reduced to pulp and then bleached white by chloride of lime. Paper can, however, be made from the pulp of various types of wood ; but softwood or conifers are essential for the best grades of paper. Of these softwoods spruce, fir and pine are of principal importance. Another essential requisite for the paper industry is a large supply of cheap power. This is easily available in Eastern Canada where there is a large supply of cheap hydro-electric power ; so the pulp industry has flourished there. A third essential requisite is cheap and efficient transport. This too is easily available in Eastern Canada where the pulp mills are mostly located near tidal waters. About 24 per cent of Canada's total export is in paper, pulp and wood. Other great exporters of these things are Norway, Sweden, Finland and also Russia. About 34 per cent of Norway's export is in timber and paper, while paper and pulp form 32 per cent and timber, 15 per cent of Swedish export. Russia supplies little of pulp or paper, but timber forms 22 per cent of her total export. Finland also supplies large quantities of softwood and paper,—nearly 80 per cent of her total export. The U.S.A. is by far the largest market for Canadian wood pulp: There is already a shortage of this commodity in Europe, and various substitutes like rags and linens and esparto grass are now being tried and used.

Conditions
of Growth

Producers.

Rubber.—Rubber is a typical equatorial product, and the tree is said to be a native of the Amazon Forests. The product is obtained from the juice of the tree. Although there are indigenous species of the rubber tree in India, the 'Para Rubber Tree' has been introduced in India, Ceylon and Malaya. It requires a rich, well-drained soil, a heavy rainfall (between 50 and 200 inches) and a moist humid climate throughout. Plantations are mostly on hill slopes because of good drainage, but special care must be taken to prevent rapid soil erosion due to excessive rain. Bulk of the product is now obtained from Malaya, the Indonesia, Ceylon and Southern India ; but Brazil also continues to supply some. The chief importers are the

United States, the United Kingdom, other European countries, Japan and Russia. The demand, as well as the consequent production, for rubber has been growing by leaps and bounds ; the average annual production during 1909-13 was 90,000 tons, in 1925 it rose to 525,000 tons, and subsequently to 1,160,000 tons in 1934-35. This phenomenal growth has been mainly due to the development and extension of the manufacture of cycles, motor cars, etc.



The Rubber-producing Countries of the World.

Other Raw Materials.—Of the various other raw materials of vegetable and animal origin gums, lac, leather Gums. and ivory may be mentioned here. Gum is obtained from the juice of certain trees, found particularly in the African savanas. Lac is obtained almost exclusively from the forests of North-Eastern India (Bengal & Assam). It is not exactly a vegetable product, but a sticky exudation of certain insects that feed upon the branches of some particular type of trees. Lac.

QUESTIONS

1. Discuss the conditions favouring the growth of (a) rice, (b) wheat, (c) tea, and (d) cotton. Name the places where they are grown in India.
2. What climatic and physical conditions are necessary for the production of the following, (a) wheat, (b) maize, (c) cotton, (d) tea and (e) jute ?

3 What are the natural conditions required for the cultivation of cotton? What countries export cotton and to what destinations?

4. Name the places where the following are grown: (a) sugar, (b) coffee, (c) flax, (d) India rubber and (e) tobacco.

5. Compare and contrast the physical and economic factors associated with the production of rice and wheat. Mention the chief countries and ports engaged in the foreign trade in these commodities.

6. Name the most important rice-importing countries of the world. From what sources is rice imported into Great Britain and to countries of Northern Europe? What is the present position of India including Burma in this export trade?

7. Into how many classes is cotton divided? Give a short account of the chief sources of supply of the principal varieties of cotton.

8 What are the climatic conditions favouring the growth of coffee and tea? What are the principal countries of production and export?

9 Discuss the conditions favouring the growth of (a) jute, (b) oil seeds, (c) coffee and (d) sugar-cane.

10 What climatic conditions are favourable or unfavourable to the cultivation of rice, cotton and sugar-cane? Explain the reasons.

11 Compare conditions necessary for the successful cultivation of beet and sugar-cane? State accurately the areas in which sugar is manufactured.

12. What are the necessary conditions for the production of the following: (a) rubber and (b) beet? Name the principal countries in which these are produced.

13. Describe the geographical circumstances favouring the growth and the world distribution of sugar beet and sugar-cane.

14. What are the most important countries of the world exporting cotton in considerable quantities? Describe fully the conditions of production and quality of cotton produced in each.

15. Name the principal silk-producing countries of the world. Do you think that artificial silk is competing seriously with natural silk?

16. Examine the physical conditions that are generally characteristic of world fishing grounds. Describe the major fisheries of the world.

17. Name the fruits of the temperate zone and discuss their commercial value.

CHAPTER V

MINERAL PRODUCTS

Minerals.—The lithosphere or the crust of the earth consists of a variety of rocks, and a rock itself is a mineral, Rocks and Minerals. igneous or stratified, constituting the solid crust of the earth. Minerals are not only hidden from our view deep down into the bowels of the earth, but also lie scattered all about us. A mineral may briefly be defined as a Mineral “naturally occurring chemical compound either constant in defined. its composition or varying within narrow limits.”¹ But all this should not lead us to suppose that the lithosphere is the only storehouse of minerals ; the central nucleus of the earth or the barysphere is probably made up almost entirely of pure iron with a certain admixture of nickel Sources of minerals. and other metals. But it is far too deep for us to penetrate. Our entire mineral resources are derived from the lithosphere alone. Rocks mostly are mixtures of various minerals, though sometimes they may represent only one or two of them. Minerals may be broadly divided into two categories—(a) *metallic* and (b) *non-metallic*. Among the metallic minerals are iron, copper, lead, tin, mercury, gold and silver. These are not, however, found in a pure Metallic and Non-metallic minerals. state, but are usually mixed up with other elements or substances ; that is what is meant by saying that the metals occur in ‘ores’. In order to obtain a pure metal, it has to be separated from its ore. Sometimes the important Metallic ores. metallic minerals are found in ‘veins’, which, in reality, are the faults or cracks in the earth’s crust along which molten rock, vapours etc., once made their way from the interior strata of the earth’s crust towards the surface, but became solidified in the cracks on the way. Non-metallic minerals are represented by coal, petroleum, salt, Metallic veins. sulphur, clay, building stones, etc. They are more numerous than are the metals.

¹ Stamp, A Commercial Geography, p. 104-5.

I. THE METALLIC MINERALS

Iron.—Iron, though not a 'precious metal', is the most valuable and useful of all the metallic minerals, and has perhaps the widest distribution. The place it holds in the life of modern man needs no description, and it has been said that there are few rocks which do not contain a certain percentage of iron. The familiar red colour of many of the rocks is most often due to the presence of iron oxide, which is a compound of oxygen with iron. But such a metallic content in the rocks is not economically useful. Iron ores obtained from mines are the only useful source. But ores differ considerably in their iron content, as well as in other materials. Four chemical groups have thus been distinguished.

Occurrence.

Chemical groups of iron ore.

(a) *The Iron Oxides*, which may be of several varieties ; but *hæmatite* (Fe_2O_3) or red ore and *magnetite* (Fe_3O_4) are the chief variations of this group. *Hæmatite* is usually red—'blood-like', and hence the name ; but it may also be a brown or blackish iron ore. *Magnetite* is magnetic iron oxide, and of a decidedly black hue ; it, too, has certain variations. These are said to be the purest form of iron. The ores of Sweden are of this type.

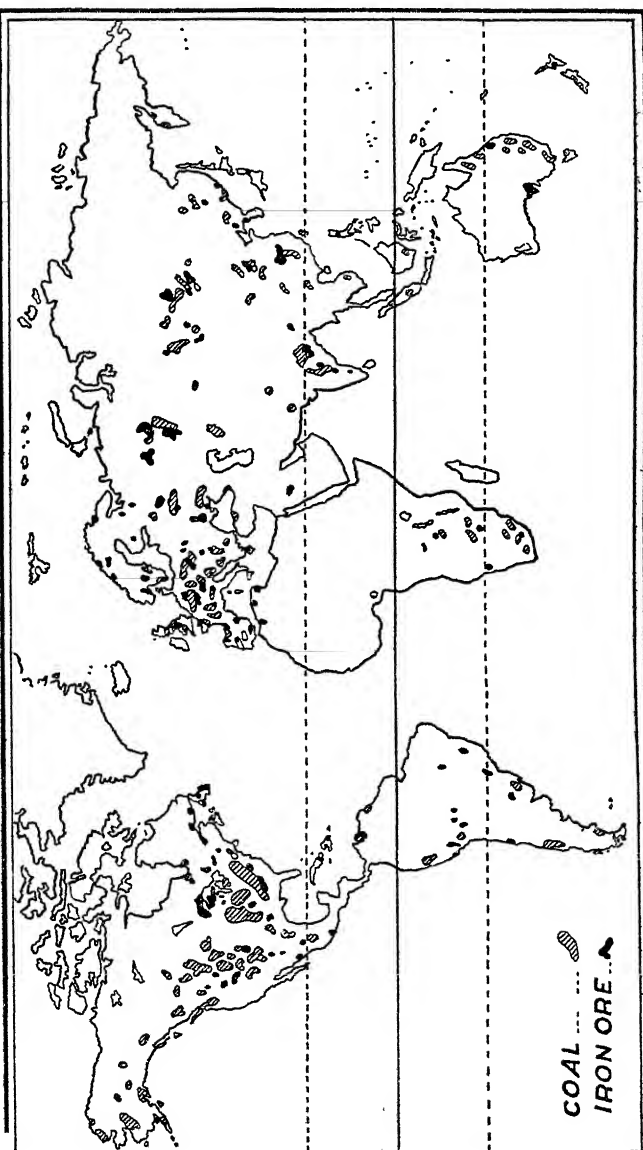
(b) *The Hydrated Oxides*, of which *limonite* ($2\text{FeO}_3\cdot 3\text{H}_2\text{O}$) is the chief sub-type. It is a brown ore ; but the whole group is distinguished by the hydrate content, which is a compound of water with the radical.

(c) *The Sulphide Ores*, including iron pyrites and copper pyrites. Pyrites are sulphides, *i.e.*, compounds of sulphur with some radical—here iron or copper.

(d) *Iron Carbonates*, which are compounds of iron and some carbonaceous matter. These include *Siderite*, *black band iron stone*, *clay iron-stone*, etc.

Preparation of Iron and Steel.

Ores containing much impurities are first heated in a furnace for evaporating the unwanted elements ; then having added a definite proportion of limestone or some other flux in order to promote fusion, they are smelted in



The Coal & Iron-ore Producing Countries of the World.

a blast furnace. Coal or coke is used in smelting iron. Thus is obtained what is commonly called 'pig iron'. This may again be smelted and we get 'cast iron'. But pig iron—and, of course, cast iron—may be given a thorough smelting so as to burn out the carbon, and then we have what is called 'wrought iron', from which steel may be made. But steel is generally made from pig iron direct by removing all carbon, sulphur and phosphorus, and adding ferromanganese. Special types of steel are produced by adding various other metals in different proportions such as manganese, nickel, chromium, tungsten, etc. Haematite, which contains least of harmful elements like phosphorus, carbon, etc., is regarded as the most valuable of all iron ores for the production of steel.

Iron ore
producing
countries.

The United States produces about one-half of the total world output of iron-ore. The ores occur mainly in the provinces of Minnesota and Michigan. In the former state Mesabi and Vermillion ranges contain the greater percentage and in the latter Gogebic, Marquette and Menominee ranges are important. The total home production is insufficient to meet the requirements of the vast iron and steel industries of the country.

The U.S.S.R. has iron-ores of good quality in Krivoi Rog and Magnet Mountain near which is the town of Magnetogorsk, an important iron and steel centre. Iron ore, although it has not been worked to any great extent yet, is known to exist in the Kuznetesk coal basin and in the neighbourhood of Minuminsk.¹ In *France* the bulk of iron-ore is obtained from Lorraine. There are deposits also on the Le Creuzot fields. In *Great Britain* the Cleveland hills was for many years the largest iron-ore producing area but has been surpassed by Lincolnshire, Leicestershire, Northamptonshire and Oxfordshire. The ores are of low grade but inexpensive to work. High grade ore is mined in smaller quantities in the Furness district of Lancashire. The home production is quite inadequate for its needs and iron-ore has to be imported from Spain and

¹ The production figure of U.S.S.R. is not officially given. In 1950 it was estimated at 19·5 million metric tons.

Principal Iron-Ore Producing Countries

In millions of Metric Tons

Countries	Average 1935-39	1952	Percentage of World's production
U. S. A. ..	43·8	50·3	46·2
France ..	27·5	13·2	12·1
Sweden ..	11·5	10·2	9·2
U. K. .	12·3	4·9	4·5
Germany ..	4·9	4·0	3·8
Canada ..	2·3	2·5	2·4
India ..	2·8	2·2	2·0
Luxemburg ..	4·9	2·1	1·9
Australia ..	1·4	1·7	1·6
Spain ..	2·0	1·2	1·0
World's Total ..		109	

Sweden. The chief *German* deposits are in Siegerland, Silesia and near Hanover. *Spain* has very rich deposits of high-grade hæmatites, mainly in the north. Iron ore occurs in North *Sweden* in the Gellivara and Kirunavara areas. In *India* iron occurs mainly in the provinces of Bihar, Orissa and Mysore. Iron ore is widely distributed in *China*. The chief areas of production are Hupeh, Shanshi and Szechwan. The ores of Shanshi are of good quality. Minor producers of iron-ore are Belgium and Luxemburg, Algeria, Chile, Newfoundland, Brazil, Australia, Cuba and Japan.

The leading iron-producing countries of the world are the United States, the United Kingdom, Germany, France, Russia and Belgium. More than three-quarters of all the pig iron of the world are produced in these six countries, and among them the U.S.A., easily ranks first with, till very recently, more than half the world's total to her credit. Japan has steadily been producing more and more pig iron, although her reserves are not quite imposing. India is also another fairly important producer and so is also Australia. Among the principal producers of pig iron all the countries except Russia (*i.e.*, U.S.A., Gr. Britain, Germany, Belgium and France) have a surplus for export, Production of Iron and Steel.
Trade.

and even in the export of steel these countries rank high. The chief importers of both pig iron and steel are India, China, Japan, South America and Canada. India imports iron and steel from the U.K., the U.S.A., Germany, France, Belgium and Japan. The United Kingdom is the biggest exporter, supplying nearly half the total requirement ; next in order comes Belgium.

Copper.—Copper, unlike iron, is often found native in nature, but the bulk of the world's production is mined from ores. It has a very wide distribution, and it entered into human civilization long before iron. Although it has long been replaced by various other metals for many of its former uses, its demand, far from being reduced, is increasing. This is mainly due to the rapid increase in the use of electricity and the development of the automobile industry. It is the best known conductor of electricity except silver, and has thus become a 'key metal' once again.

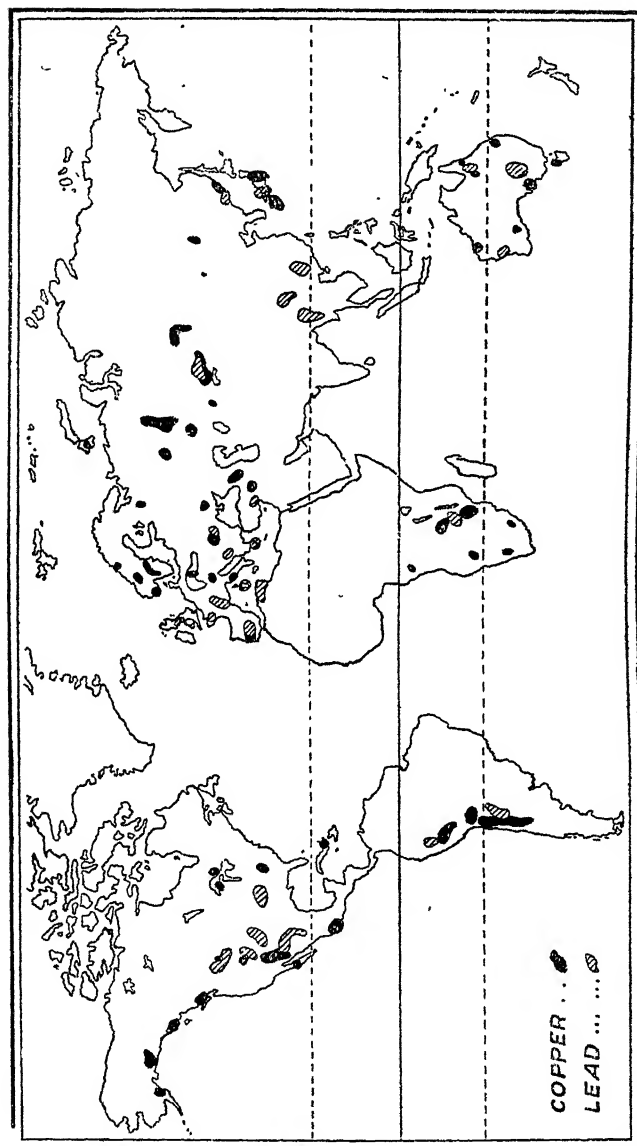
The United States is the biggest producer of copper, with nearly 35 per cent., of the world's production to its credit. Next comes Central Africa with an annual output of a little above 16 per cent. A close third is Chile followed by Canada. Japan, which is usually rather poor

Production of Copper Ores 1952

(In thousands of Metric Tons)

U. S. A.	..	..	838·7	Mexico	..	..	58·5
Chile	..	..	404·7	Japan	..	..	53·6
Central Africa	..	..	525·0	Yugoslavia	..	..	37·0
Canada	..	..	233·8	S. Africa	..	..	34·2
World's Total (excluding U.S.S.R.)				..	..	..	2,400

in mineral reserves, is an important producer of this red metal. Other important producers are Mexico, Russia, Peru, and the Iberian Peninsula (Spain-Portugal). Many are of opinion that the richest reserves of copper, however, lie in Central Africa, partly in the territory of Rhodesia and partly in the neighbouring parts of the Belgian Congo. The U.S.A., although still ranking highest in the scale of production, has, however, got to import large quantities of copper from other countries for its electrical and



Copper and Lead Producing Countries of the World

automobile industries. The leading exporters are Canada, Peru, Mexico, Chile, Belgian Congo and Rhodesia etc. The importers are U.K., Germany, France, India, China etc.

Source
and Uses.

Lead.—Lead ranks third among metals in the scale of production and second in the diversity of usefulness. It is used in the manufacture of automobiles, airplanes, locomotives, typewriters, calculating machines, printing materials, musical instruments, rifles, shots, bullets, electrical equipment like batteries and cable-covering, paints and a host of other things. Like copper it is obtained chiefly from ores, and is commonly found associated with igneous and metamorphic rocks. It is often found along with a small percentage of silver and zinc, and that is why sometimes these three metals—lead, silver and zinc—are mined from the same source.

Production.

The total world production of Lead ore in 1951 (excluding U.S.S.R.) was about 1550 thousand metric tons. North America is the world's greatest storehouse of lead as of many other metals. The U.S.A., is the largest producer (350 thousand metric tons) and along with Canada and Mexico supplies half the world's total. Individually Mexico is the second largest producer of lead, with about 225 thousand metric tons to her credit ; Australia occupies the third place. Other important producers are Canada, Italy, Germany, Japan, Peru, Spain, U.S.S.R., Burma etc.

Trade.

The principal exporting countries of lead and lead-ores are Australia, Mexico, Spain, Canada and Peru. The important importing countries are Great Britain, Japan, India, Pakistan etc.

Uses.

Zinc is used chiefly for the galvanizing of iron and steel,—an industry that consumes between 40 and 50 per cent. of the total zinc output of the world. Galvanized iron is nothing but iron coated with zinc to prevent rusting. The second great industry consuming about 30 per cent. of the total is that of brass-making. Brass is produced by a combination of zinc with copper, and is used for gears, propellers, stem fittings, worm wheels, bearings, tubing, valves, automobile parts and various other things. Zinc is also used in the manufacture of paints.

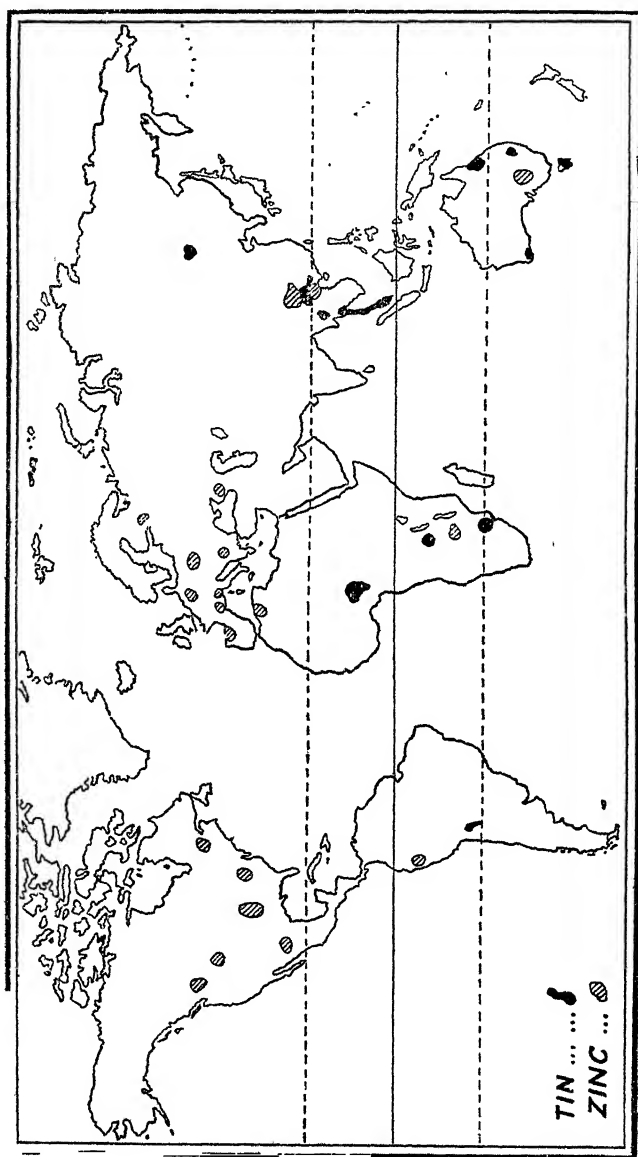
The U. S. A. is the leading producer of Zinc in the world. Mexico and U.S.S.R., are the close rivals for the second place. Australia comes next. Other important producers are Canada, Peru, Poland, Germany, Italy, Spain, Burma, and Belgian Congo. Total world's output in 1951 (excluding U.S.S.R.) was estimated at 2,240,000 metric tons. Production.

The principal exporters of zinc are Australia, U.S.A., Belgian Congo, Canada, Burma etc. The Principal Trade importers are Great Britain, Germany, France, U.S.S.R., India etc.

Tin.—Tin is also one of the indispensable base metals or a 'key metal' like iron, copper, etc. It has a variety of Uses. uses like applying it as a coating for other metals, manufacturing tin containers, making alloys like solder, brass and bronze and a score of other products.

The largest deposits of tin are found in South-Eastern Asia ; the Malaya States, Indonesia and the neighbouring areas of Burma, Siam and China together produce nearly two-thirds of the world's tin. Outside this area the next biggest producer is Bolivia, contributing a quarter of the world's total production of this metal. The next great producer is Nigeria. Among the lesser producers the name of Australia may be mentioned, but her output is quite small in comparison with that of even Nigeria. The province of Cornwall in Britain once had large deposits of tin, but the total output now is quite small. The U.S.A., so rich in various other minerals, is devoid of tin, and has got to import large quantities from other countries, especially Bolivia. Production.

Aluminium.—Aluminium is a very light and yet strong metal with only one-third of the specific weight of iron, and with rapid development of the manufacture of automobiles and airplanes its demand has shown a phenomenal increase ; during the last two decades its output is said to have increased 200 per cent. It is also used in the manufacture of furniture, kitchen ware, optical goods, scientific instruments and paints. It is a fairly good con- Uses.



The Tin and Zinc Producing Areas of the World.

ductor of electricity and possesses a high thermal conductivity. But it is more expensive than either iron or steel. Like iron it is quite abundant in nature, and is very widely distributed. But the task of separating it from the ore is generally very difficult and costly. Bauxite is a kind of aluminium ore which, however, is comparatively easy of exploitation, and contains the highest percentage of the metal. France has the largest known reserves of bauxite in the world ; other important deposits are found in the Guianas and the U.S.A. ; lesser deposits of bauxite are found chiefly in Yugoslavia, Italy and Hungary. Source.

Yet the largest producer of aluminium is the United States with about two-fifths of the world's production to her credit. Canada comes next ; but her contribution is less than two-fifths of that of the U.S.A. France ranks third in the scale of production with about three-fifths of Canada's output, followed closely by Germany and Norway. Switzerland ranks sixth with about two-thirds of the total output of France, and is followed closely by Great Britain. Among the leading producers of aluminium Italy holds the last place with about half the output of Switzerland. Output.

Gold.—Gold is one of the precious metals, and, though not really the most precious, it can well be called 'the king of metals.' For it is actually a very remarkable metal : it does not rust as does iron, nor does it change into a sulphide as does silver. It is thus a very stable metal. Gold is usually found 'native' in nature. Its sources may be broadly divided into two classes : (1) *Alluvial or placer deposits* and (2) *Reef or lode deposits*. Sources.

(1) *Alluvial or placer deposits* occur as a result of the washing out of the parent rock by streams and are found in beds carved out by them. These streams must originate or pass through gold-bearing regions. The metal, however, is heavy, and the streams can thus carry on the work of transportation so long as there is high force in the current ; as the force of the current begins to diminish the gold begins to be deposited in the beds and in course of time get concentrated in certain parts of them. These richer parts of (1) Alluvial or placer deposits.

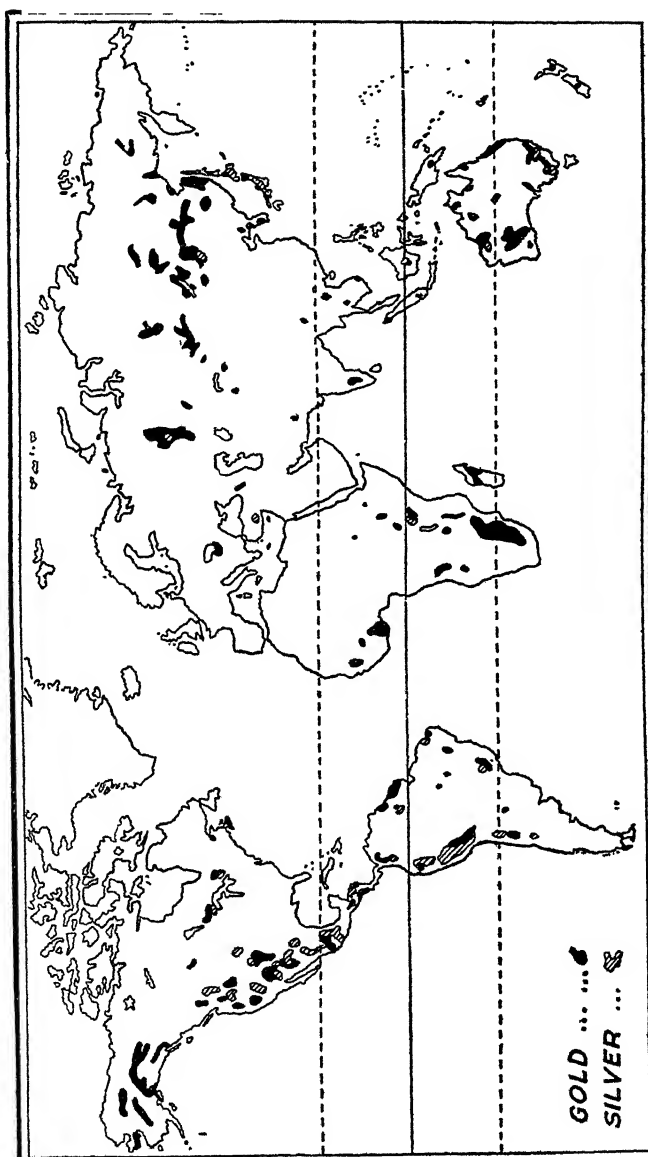
the beds are called 'pay streaks.' The gold thus deposited may occur either as particles and dust or in larger masses called nuggets. The work of the miner in getting placer gold is quite simple,—he is required only to wash the gold out of mud and soil and thus gather a rich harvest with ease. But sometimes the gold particles occur in the form of microscopic dust ; then they have to be separated out and collected by chemical means.

Reef
or lode
deposits.

(2) *The reef or lode deposits* are usually found in igneous rocks, and often up to great depths in the earth's crust, *i.e.*, in mines. The lodes generally contain much useless minerals as well, and have to be separated by crushing. Placer gold deposits when metamorphosed into hard siliceous masses deep down into the earth have also the appearance of mines.

World
production
of Gold.

The gold production of the world since the beginning of the opening decade of the present century has remained remarkably constant. The total world output of gold in 1952 was about 756 thousands kilograms. The Union of South Africa is easily the greatest gold-producing country of the world accounting by itself for about half the total world-output. The greater part of the output is obtained from the Witwatersrand. There are still huge reserves in the neighbouring areas. The U.S.A. together with Canada supply about a quarter of the world's total annually. All through the Rocky Mountains from Alaska to Mexico gold is widely distributed. The Canadian Shield, which is an extensive area of ancient metamorphic rock, is particularly noted for lode deposits. Russia is also one of the foremost gold-producers ; her Lena gold fields of Siberia are world-famous. Under the present Soviet regime she has increased her gold-production enormously. Other important producers are Australia and New Zealand, Mexico and South America, Southern Rhodesia, Gold Coast in Africa, and India. Of these Australia and New Zealand were once very important producers ; but now both the placer deposits and lode deposits have become nearly wholly worked out and so the production has fallen to a very low level. The gold field of Kalgoorlie in Australia, once so



The Gold and Silver Producing Areas of the World.

famous, has now fallen into the back-ground. The Kolar field is the only noteworthy gold-field in India, but it too has been very nearly emptied now.

World Production of Gold

Countries	Percentage 1935	Countries	Percentage 1952
Union of South Africa ..	49	Union of South Africa ..	48·6
Canada ..	15	U. S. S. R. ..	—
U. S. S. R. ..	12	Canada ..	18·3
U. S. A. ..	11	U. S. A. ..	7·9
Australia ..	5	Australia ..	4·0
S. America ..	4	Gold Coast ..	2·8
S. Rhodesia ..	2	S. Rhodesia ..	2·0
Others ..	2	Phillipines ..	1·9

Uses of
gold.

The uses of gold for coins and jewellery are well-known. Its rarity, its beauty and durability together with the fact that it is easily worked, have caused it to be not only highly prized, but also to serve as a standard of evaluation in our economic and commercial transactions. But gold has many essential industrial and medicinal uses as well.

Sources.

Silver.—The bulk of the world's silver, unlike that of gold, is not found 'native' in nature. Native silver is rare ; most of it—no less than two-thirds—is found associated with lead, and that is why, generally speaking, the important lead-producing countries are also important silver-producing regions. Besides, much silver is obtained from gold and copper ores. Silver rarely, if at all, occurs as alluvial deposits.

Production.

Mexico is the largest producer of silver in the world, her contribution being a little below a third of the world's total. The U. S. A. comes second and Canada holds the third place. Thus the North American Continent as a whole is by far the largest producer of this metal with about two-thirds of the world's total silver output. Peru and Bolivia in South America are also important producers. In Europe, Germany and Spain are important, and in Asia

the two most noteworthy producers are Burma and Japan. Australia is also not an insignificant producer. Total world output of silver in 1952 (excluding U.S.S.R.) was about 5,800 metric tons.

Silver is harder and less beautiful than gold ; moreover it, unlike gold, turns into sulphide, though slowly, and this is what is generally known as the tarnishing of silver. ^{Uses of Silver.} It is also much more widely distributed than is gold, and, of course, is much cheaper. Besides being used in coinage and jewellery of lesser value, it is largely and more generally used in industry ; tableware and plates of various kinds are made of it. Silver is exported from Australia, Mexico, Canada, Peru, Belgian Congo etc. The principal importers are Great Britain, India, Pakistan, China, Germany, France and others.

Platinum.—Platinum, like gold and silver, is a 'precious metal'. It is even much rarer than gold, and consequently more precious, though not so highly prized by all and sundry. The biggest producer is Russia, particularly the Urals. Rhodesia probably comes next. The U. S. A. , is also another important producer. Some amount of the ^{Producers.} metal is obtained from Colombia as well. It is one of the essential minerals for the manufacture of laboratory utensils, because it is highly resistant to acids and temperature. It is extensively used in photography and ^{Uses.} electrical business. Like gold and silver it has a demand in dentistry and jewellery business.

Quicksilver.—Quicksilver commonly occurs in the form of sulphide of mercury or cinnabar. In order to procure ^{Nature.} it the ore is heated or 'roasted' and the vapour collected and condensed. Its density is very high—13·6, and it readily changes in volume with the fluctuations of temperature. So mercury is used in thermometers, barometers and hygrometers. It is also used in separating gold from ^{Uses.} impurities as it easily forms an amalgam with gold when mixed with the latter. It has many other uses—industrial as well as medicinal. It is combined with tin to coat the backs of mirrors, is used extensively in the manufacture

Production. of explosive caps, and so on. The chief producers of mercury or quick-silver are Spain, the United States, Austria, Italy and Russia.

Uses and sources. **Manganese-ore.**—The importance of manganese is for its use in the steel industry. It makes steel tough and tenacious. The U.S.S.R., is the chief producer, the important areas being Georgia and Nikopol district. The U.S.S.R., produces about 45 per cent. of the world output. India comes next with about 1/5th of the world output to her credit. The deposits are in M.P., Madras, Bombay, Bihar, Orissa and Mysore. Other producers are Gold Coast, Germany, Egypt, Brazil and the U. S. A.

Tungsten. **Minor Metals.**—It is not possible here for reasons of space to give an exhaustive list of all the metals ; but the more important of the minor metals may be mentioned. *Tungsten*, for example, is such a one. It is used in the manufacture of steel—for the production of different kinds of steel. The quantity required is, however, small, but nonetheless essential. China is perhaps the leading producer of tungsten, and Burma probably comes next. Other important producers are U. S. A., Malaya and Bolivia.

Chromium. Another important ingredient of steel is *Chromium*. It is specially noted for rendering steel stainless. Moreover, chromium is extensively used in the manufacture of certain paints. Rhodesia is the leading producer and Yugoslavia comes next. Other important producers are South Africa and India.

Magnesium. *Magnesium*—It is used in the manufacture of refractory bricks (fire bricks) ; for lining electric furnaces and in medicine. It is found in India in the chalk hills near Salem, in Coorg and in the Mysore state.

Nickel. *Nickel* is used in steel making, plating and coining. Nickel-steel is hard and elastic and is used in the manufacture of parts of watches, propeller, cables, scales, etc. Sudbury district of Ontario in Canada produces more than 85 per cent. of the world's total output. Other producers are New Caledonia and U.S.S.R.

Antimony.—It is used to give hardness to softer *Antimony*. metals in various alloys and particularly in the making of type metal, bell-metal and Britannia metal. The ore is principally obtained from *China*. India has large reserves of this metal in the Punjab and Mysore.

II. NON-METALLIC MINERALS

Non-Metallic Minerals.—Non-metallic minerals are very numerous,—in fact, more numerous than are the metals. They are generally more abundant and widely distributed in nature, and are consequently cheaper, but not necessarily less important. These non-metallic minerals are represented by coal and petroleum, salt and sulphur, building stones and clays. Of these coal and petroleum are of primary importance; they are the chief sources of industrial power, and on that account merit a more detailed treatment in a separate chapter.

Salt.—Common salt is often chemically known as halite. It is one of the indispensable necessities of life, and contains 60·6 per cent. of sodium and 39·4 per cent. of *Nature*. chlorine. It occurs extensively in the crust of the earth in a solid form. This is called rock salt, and is often found in the form of brine. Salt is also obtained from sea water, as well as from the inland waters such as the Dead Sea, the *Distribution* Great Salt Lake, etc. Salt is very widely distributed. It has been estimated that from each 100 pounds of sea-water about three and a half pounds of mineral may be obtained by evaporating the water, and the bulk of this mineral matter is common salt. There are rich deposits of rock salt in various countries. And in many places the salt industry is a government monopoly. Besides being used in food, salt is essential in packing and preserving fish, meat, *Uses*. hides, butter, pickles and hay. It is used also in the manufacture of soda, glass, bleaching powder, pottery and the refining of silver.

Sulphur.—Sulphur, unlike salt, is not widely distributed, being found generally in the volcanic regions. It is *Distribution and uses*. used in medicine, in vulcanizing rubber, manufacturing

gun-powder and in drying peaches, apricots and other deciduous fruits. Sulphuric acid is required for the manufacture of glass, matches, alum, kerosene, aniline colours, blue vitriol, green vitriol, etc. Sulphurous acid is used in the production of paper pulp, in bleaching and in various disinfectants. The leading producer of sulphur is the island of Sicily ; next in order comes Japan, and the third place is occupied by the U. S. A. There are about one thousand sulphur mines in Sicily and Italy put together, yielding more than half a million tons a year.

Mineral Waters.—The waters of certain springs and pools are famed for their medicinal value—real or supposed. Anyway, the reputation of such waters has led to the growth of towns and cities in their neighbourhood. Such are the towns of Bath in England, Vichy in France, Baden in Germany, Carlsbad in Austria, Saratoga in New York. We in India, too, have no dearth of such mineral springs and towns associated with them ; moreover, most of these in our country are looked upon as sacred places and thousands visit them yearly on pilgrimage. Now-a-days great quantities of mineral waters are bottled and shipped for distant places so that it has grown into an industry of considerable importance. It has been estimated that the average annual value of mineral water sold in the U. S. A. from the springs and pools of that country alone comes up to about 5 million dollars.¹

Asbestos.—This mineral is used for the manufacture of fire resisters, gas stoves, etc. It is non-conductor of heat. Canada is the leading producer and accounts for about three-fifths of the world total. The deposits are found in S. Quebec.

Diamonds.—Diamonds are the most important of the various precious stones. It is also said to be the hardest

¹ The term 'mineral water' is to some extent, misleading, because all ground water contains minerals. The amount of mineral matter is determined by the length of time water has remained underground, the temperature of the water and the constituents and character of the rock with which it has come into contact. We speak of 'mineral water' when the mineral content is high and appreciable because of taste, odour or colour.

substance yet known. In composition, however, nothing can be more simple than this coveted jewel ; for it is pure carbon. But not all diamonds are valuable ; for there are black diamonds which are useless as gems ; they are used as tips for rock drills.

The leading producer of diamond is South Africa ; the diamond mines near Kimberly are world-famous. Other important producers are Brazil and India. The chief centres for the cutting and polishing of this precious stone are Amsterdam in Holland and Antwerp in Belgium, and the chief market is the U.S.A.

Mica.—It is indispensable for its use as insulator in the electrical industry. India is the most important mica-producing country of the world. Other producing countries are the U.S.A., Canada, East Africa and Brazil.

Mineral Fertilizers.—Of the various mineral fertilizers found in nature the best known is perhaps *Sodium Nitrate*. It is really a very soluble salt, and is found in large quantities in the temperate desert regions. Northern Chile is the leading producer of this mineral, and formerly it was the main export of that country. The countries practising intensive agriculture like the U.S.A., the countries of Northern Europe and Egypt were her chief customers. But the invention of artificial mineral fertilizers has adversely interfered with this trade. Another natural mineral fertilizer is *Phosphates*, found native in huge deposits in Algeria, Tunis, Florida, the Pacific Islands of Nauru and Ocean Island. But the trade in phosphates has also been affected by a slump owing to the advent in the field of artificial phosphates. Of the various artificial fertilizers may be named *calcium nitrate*, produced in large quantities in Norway, *sulphate of ammonia*, and the various *potash salts*.

III. BUILDING STONES AND CLAY PRODUCTS

Granite.—Granite is an igneous rock containing, as it does, feldspar, quartz and mica. Its hardness is proverbial, and because of its highly compact structure it is

singularly resistant to weathering. It takes a high polish.

Nature. Thus it is one of the most useful of the building stones. But it is very expensive to quarry and extremely difficult to shape. It is, therefore, used in constructing large and massive edifices, in erecting monuments, curbs and paving blocks. It is also used as a ballast on streets and railroads.

Uses. Although granite is fairly well distributed throughout the world, its occurrence is less common than that of sandstone and limestone. The transportation of granite, as well as of other kinds of stone, is difficult and expensive. Quarries are, therefore, rarely worked far from the markets.

Basalt.—Basalt is also another class of igneous rock, but comparatively less compact. Of all the basaltic rocks traprock is probably most widely used. Its chief uses are in the construction of roads and concrete. It is also used, though somewhat sparingly, for building purposes. It is rather widely distributed, especially in volcanic regions.

Nature.

Uses.

Sandstone.—Sandstone is a sedimentary or stratified rock. It is much more widely distributed than either granite or basalt. Though a sedimentary rock, it is of inorganic origin, being formed from sand-grains deposited in water. The sand-grains adhere together because of the presence of a cementing substance naturally formed. This cementing material may be of various kinds, some of which give the sand-grains much more coherence than do others. Thus when the grains are bound together by silica, the sandstone becomes highly durable. The occurrence of sandstone being common in almost every land, it is very widely used for building purposes. Whetstones and grindstones are almost exclusively manufactured from it.

Nature.

Uses.

Limestone.—Like sandstone, limestone is also a sedimentary rock, but unlike the former it is of organic origin. When the marine animals die the lime of their skeletons is converted into limestone rock. It is interesting to note that these animals derive their lime from the ocean waters. That is why limestones frequently contain fossils of animals long extinct. Limestone probably has a wider range of use than sandstone. It is extensively used in the

Nature

Uses.

construction of buildings, in paving streets, in the manufacture of lime and as a furnace flux.

Marble.—Marble is, in fact, metamorphosed lime stone. It is formed by the action chiefly of heat and pressure. Like granite it takes a high polish, and is, however, less common than that of limestone and sandstone. Like granite, again, marble is difficult and expensive to quarry Nature and put into shape. Yet it is extensively used in the making of pillars and other ornamental structures, and that is because of its varied colours and excellent finish. Marble is, however, much more easily damaged in quarrying than Uses, granite or limestone.

Slate.—Slate is metamorphosed mudstone or shale. Shale, again, is another sedimentary rock containing, as it does, particles of mud hardened and cemented. It is used Nature as a roofing material, in the making of blackboards, school-slates, flooring, table-tops, mantels, vats, fainscotting, Uses, laundry-tubs and refrigerator shelves.

Clay Products.—It is common knowledge that clay can be moulded when wet and it hardens when dried. This is the principle of fashioning bricks, and it was discovered thousands of years ago. In places where building timber Bricks. was a rarity bricks came to be of primary use in the construction of houses and dwelling places. Thus the great Chaldean and Assyrian palaces were built almost exclusively of sun-dried bricks. So it was in Egypt and in Mohenjodaro and Harappa in our country. Clay is formed as a result of the decomposition of various minerals, particularly feldspar. It has the capacity to absorb various substances and these substances easily solidify and harden the clay when dried in the sun or baked in the fire. The commonest form of clay used in the building purposes is, of course, brick. When clay is combined with brick and dried or baked, the resulting brick takes on great strength and furnishes an excellent building material. From clay we Uses of bricks, have quite a number of such materials—building brick, fire-brick, paving-brick, as well as pottery, draintiles, roofing-tiles, sewer-yipe etc.

Kaolin and Pottery. In the manufacture of pottery, however, the purest form of clay is now more extensively used : this substance is known as *Kaolin*.

Nature. **Cement.**—Cement is manufactured primarily from limestone and clay. It, too, is no new novelty ; for it has been known in Europe since Roman times. Now-a-days it is re-inforced by steel and makes quite a durable structure. The uses of cement are obvious. It is used in the building of bridges, brick edifices and other structures meant to stand high strain or great weight.

Uses.

QUESTIONS

1. Write short notes on any six of the following, indicating the countries where each may be found :—(a) Asbestos, (b) Copper, (c) Manganese, (d) Mica, (e) Nickel, (f) Tin, (g) Saltpetre, (h) Zinc.
2. Write short notes on the use of any four of the following and also state their sources of supply .—(a) Platinum, (b) Mica, (c) Zinc, (d) Copper, (e) Manganese and (f) Graphite
3. Write short notes on the following, stating the places where they are to be found :—(a) Copper, (b) Mica, (c) Tin, (d) Lead.
4. Write short notes on the use of any five of the following, indicating the countries where each may be found :—(a) Copper, (b) Mica, (c) Tin, (d) Zinc, (e) Gold, (f) Manganese.
5. Name the sources of supply of Silver, mentioning the processes by which the metal is obtained in those places.
6. State the importance of the following metals in the metallurgical industries :—(a) Nickel, (b) Aluminium, (c) Antimony, (d) Magnesium; and where are these metals mainly found? Has India any share in their production?
7. Name the important sources of supply of non-ferrous metals outside Europe. How and where are the supplies being consumed today?
8. Write an account of the world distribution of Copper deposits.

CHAPTER VI

FUEL AND POWER

Sources.—Fuel and power are inseparable as the one supplies the other. And yet the former is not the only source of power ; for wind and moving water, amongst others, are also good sources of power. In the past, wood and its derivative, charcoal, were the two great sources of fuel, and hence of power as well. Nowadays the force of the wind is far less employed than formerly, though that of running water is still harnessed. Industrial alcohol is widely used as fuel in many countries ; the Germans particularly have made almost a speciality of it ; it is derived from potatoes. In South Africa, again, they obtain motor spirit from sugar. But the present-day sources of power pre-eminently are coal and oil.

Sources
of power.

Coal.—As has already been noted in the last chapter, both coal and oil (petroleum) are minerals. They are of organic origin and occur in sedimentary rock. Coal is actually an organic sedimentary rock. 'It is a mineral substance of a dark brown or black colour, composed of the remains of plants and containing such proportions of carbon and hydrogen that it can be used as a fuel'. "We can picture the forest from which the coal has been formed as a huge level swamp with a muddy floor covered perhaps with water. Successive generations of plants, very different from those growing at the present day, grew, thrived and decayed, and gave rise to a mass of decaying vegetation in the stagnant water. This process of accumulation was terminated by a series of earth movements or earthquakes, and the whole area was overwhelmed by masses of sand or other sediment and so buried."¹ This, in short, is the age-long history of coal formation. Coal occurs in layers called seams. A coal seam originating from forests of long duration is naturally thick ; where, on the contrary, forests were of shorter duration the resulting coal seams

Nature and
Formation.

¹ Stamp, *A Commercial Geography*, p. 117.

Carboni-
ferous
Age.

are thin. It is interesting to note that the swamp forests which have been changed into coal were very widely spread in a certain period of the earth's history, and consequently the bulk of the world's coal measures was formed at a certain geological age : this period has accordingly been called the 'Carboniferous Age'. But though the Carboniferous Age was the great coal-forming period in the earth's history as the Tertiary was the great mountain-building age, coal seams of lesser extent generally are found in the rocks of nearly all the geological ages. The seams or layers of coal vary in thickness from a few inches to several feet. They are separated from one another by the intervening layers of sedimentary rock, generally of shale or sandstone and occasionally of limestone.

Coal, however, is of many types :¹

Types of
Coal.

(1) *Brown Coal* or *lignite* : most of the younger coals belong to this type ; for in it we find that the vegetation has not been completely changed into coal, and so it contains a proportion of the original fragments of wood or leaves which constituted the parent material. Moreover, lignites very often contain a relatively large proportion of moisture, and so these may break up into small fragments after mining. Many countries possess extensive fields of this type of coal. Germany and Australia have such coal measures. In Germany 9 tons of lignite are generally found to be equivalent to 2 tons of good coal.

(2) *Cannel Coals*, said to be a curious type of coal which give a long smoky flame. It is neither important nor abundant.

(3) *Humic or Bituminous Coals*, which include many varieties of coal of commoner use. Those which readily form coke are called 'coking coals', those most suitable for raising steam are known as 'steam coals'. There is a soft variety which gives out a brilliant flame and since this is most suitable for household purposes, it is called 'household coal'. There is another variety which is hard and is extensively used in steamers and for export.

¹ Stamp, *A Commercial Geography*, pp. 118-119.

(4) *Anthracite*, probably the best type of coal when all things are considered. It is very hard and bright, and does not readily ignite ; but since it contains the lowest percentage of volatile matter, it, if once alight, gives out a very intense heat.

This differentiation of coals probably requires a little more explanation. Let us recall the process of coal formation. When sediments accumulate in huge quantities, the accumulated mass of material naturally exert great pressure and generate heat ; the vegetable matter thus gets greatly compressed and otherwise changed—almost metamorphosed. A given thickness of coal, it has been estimated, represents nearly 7 per cent of the original thickness of the layer of vegetation entering into the formation. Thus about 14 feet of vegetable matter is represented by only one foot of coal. While coal is being formed—obviously a very slow and durable process—hydrogen, oxygen and nitrogen are given off ; this results in a relative increase of carbon at each successive stage, and that relative amount of carbon determines the character of the coal. This may be summarized by the following table :¹

	Carbon per cent.	Hydrogen per cent.	Oxygen per cent.	Nitrogen per cent.	Composi- tion of different types of Coal.
Wood	50	6	43	1	
Peat	59	6	33	2	
Lignite	69	5.5	25	0.8	
Bituminous	82	5.0	1.3	0.8	
Anthracite	95	2.5	2.5	Trace	

The coal resources of the world have been measured by experts. It has been estimated that within 6,000 feet of the earth's surface there lie hidden approximately 8,000 billion tons of coal,—an amount said to be large enough to last the world roughly 4,000 years if the present rate of consumption remains constant till the advent of that remote age.² And this estimate has been conducted on the assumption that one-fourth of the coal will be lost because

Coal
reserves of
the World.

¹ Chamberlain, *Geography*, p. 315. The figures represent average conditions only.

² Case & Bergsmark, *College Geography*, p. 571.

of defective methods of mining. The distribution of coal measures has thus been estimated :

The Coal reserves of the World.¹

North America—

U. S. A. ..	..	43·5	p.c.
Canada ..	..	5·5	"

Asia (including Russia)—

China ..	..	5·75	"
Others ..	..	2·25	"
U. S. S. R. ..	..	22	"

Europe (excluding Russia)—

Germany	7·75	"
U. K.	4	"
Others	3·25	"

Australia 3 ..

Africa 2·25 ..

South America 75 ..

TOTAL	100	p.c.
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Distribution
of Coal.

Thus North America has nearly half the world's coal known to exist.² Asia with the bulk of her deposits in Siberia and China shares about a quarter of the world's total yet known, and Europe, the cradle of modern industrialism, contains much less than does Asia. Australia, Africa and South America have fared worst in this respect. But again, there is only a limited reserve of high-grade anthracite coal in the world. The great bulk of coal, especially in the U.S.A., is said to be low-rank bituminous, sub-bituminous and lignite.

About 1,500 million tons of coal on the average are raised annually in all parts of the world. The great bulk

¹ Stamp, *A Commercial Geography*, p. 119.

² But see Case & Bergsmark, *College Geography*, p. 573 where it has been definitely stated that 'North America contains about 67 per cent. of the world's total coal resources, and the United States contains more than half of the total known reserve.'

of this huge quantity about 80 per cent is bituminous, and only a little more than 5 per cent are of the best-grade anthracite, and about 15 per cent are lignite. One-third of the total coal raised is mined in the U.S.A., one-sixth in the U.K., and a little more than one-sixth in Germany. Thus these three countries together produce about two-thirds of the world's total. The greater portion of coal in Germany is lignite. The entire output of the U.K., on the other hand, is bituminous.

The total annual output during 1909-13 was 1,215 million tons, in 1921-25 it came down to 1,178 and subsequently it rose in 1952 to 1218 million tons.

The World Production of Coal

Percentage of World's total			
1931-35		1952	
Country	p.c.	Country	p.c.
U S. A.	35	U. S. A.	37
Great Britain	21	U S S. R.	25
Germany	11	U K.	20
Russia	7	Germany	10
France	4	Poland	7
Poland	3	France	5
Belgium	2	India	3
Rest of Europe	6	Japan	3
Japan	3	Belgium	2
India	2	South Africa	2
Rest of Asia	3		
Canada	1		
Africa	1		
Australia	1		

The important coalfields of the world are :—

I. The Appalachian or Pennsylvanian coalfield, which lies in the eastern part of the United States. It is the largest coalfield of the world yet discovered. Although in reality one continuous field, it is worked in different parts and hence is commonly referred to in the plural. Taking all these parts together we find that this one field produces nearly three-fourths of the coal output of the U.S.A. The eastern half of the U.S.A. is really the great coal region of that vast territory, being dotted about by various other fields of lesser importance. The U.S.A., raises about 450 million metric tons on the average annually.

- Europe.** **II. The Coalfields of Northern France and Belgium** lie generally in a belt which extends from Great Britain through Northern France, Belgium, Holland, Germany and Poland and penetrate right into Russia. This affords a rather sharp contrast to the situation in Southern Europe which has few or no coalfields. But although these fields lie in a belt, they do not constitute one continuous stretch like the vast coal measures of the Appalachian field of the U.S.A. The coalfield of Northern France and Belgium is only a member of the northern group. It is the most important field of France and Belgium and both these countries owe much of their industrial development to it. But the coal obtained from this field is quite low-grade.
- Europe.** **III. The Campine Coalfield of Northern Belgium and Holland** lies, like that of Northern France and Belgium, within two territories. It affords a second source of coal to Belgium ; but it is the only resource of that essential commodity to Holland.
- Europe.** **IV. The Ruhr Coalfield** which lies in the valley of the Ruhr, a tributary to the Rhine, is the leading coalfield of Germany.
- Europe.** **V. The Saar Coalfield** lies on the borders of France and Germany.
- VI. The Upper Silesian Coalfield** is peculiarly situated ; one part of it falls into Germany, another into Poland, and a third into Czechoslovakia.
- European Russia.** **VII. The Donetz Field** lies north-east of the Black Sea. It is one of the two leading coalfields of European Russia.
- European Russia.** **VIII. The Moscow Field** is the other leading coal-field of European Russia. But the coal is lignite.
- Other coal-fields of Europe.** Besides these there are many smaller fields in Europe ; of these the bituminous fields of Northern Spain and the Central Plateau of France are of importance. There are important deposits of lignite as well as of bituminous coal here and there throughout Central Europe, especially

in Germany (Koln, Saxony), Austria, Czechoslovakia, Hungary, Rumania and even in Italy, Yugoslavia and Bulgaria.

There are vast stores of semi-bituminous coal in Canada ^{Canada.} towards the prairies of that country, besides some scattered measures of high-grade coal in the region of British Columbia. In Nova Scotia also fairly large deposits of ^{Nova Scotia.} good coal have been discovered.

In Asia, Japan is an important coal-mining country, ^{Asia.} and has small but fairly important field, particularly in both the northern and southern fringes. And yet they are inadequate for her internal needs ; for Japan is an industrial country rivalling Great Britain or Germany. Manchuria ^{Manchuria.} also possesses fairly good reserves of coal, and that is one reason why the neighbouring countries take so much interest in her. The coalfields of China contain huge reserves, and China, some of her fields, unworked yet, may be as large as the Appalachian coalfield of the U.S.A., particularly the one of Shansi and Shensi in the north, situated near the celebrated Great Wall of China. India ^{India.} is said to occupy the sixth place among the great coal-raising countries of the world. About 90 per cent. of her total output comes from the three provinces of Bengal, Bihar and Orissa. The most important of her coalfields is the one at Raniganj (Bengal) in the valley of the river Damodar about 120 miles from Calcutta. Other important centres are Jherria, Giridih, Rajmahal, Daltonganj and Talcher. The coal of Karanpura, Bokaro, Barakar, etc., are of low-grade. There are coal deposits of lesser importance in Makoom (Assam), Darjeeling (Bengal), Wardha (M.P.), Singareni (Hyderabad), Bikaner (Rajputana) and in the state of Rewa in Central India. Very small coal measures have also been discovered in Baluchistan ^{Siberia.} and the Punjab. Siberia contains important coal resources. The great Trans-Siberian Railway, which connects the coal measures of Vladivostok with those of the Moscow basin, actually passes through a number of important coalfields on the way ; of these intermediate fields those of the Kuznetzk, Kansk, Irkutsk and Minuminsk basins fields only

have partly been explored yet ; farther north of these the coalfields of the Tungusk and Yakutia basins are perhaps the most important. There are various other fields of varying importance ; but the one in the Pechora basin in the north and the other in the Ferghana basin in the south are well-worked and important.

Africa. There is surprising divergence of opinion regarding Africa's share of coal resources. At one time it was supposed that the vast continent was very poor in this respect, and this belief persists even to this day with quite well-informed men. The Union of South Africa, however, has quite large deposits of coal. Rhodesia also has fairly important deposits. Quite recently, however, it has been discovered that Nigeria in West Africa possesses considerable resources of coal.

Australia and New Zealand. The most important coalfield of Australia is in Sydney. Another deposit of lignite is in Victoria. There is no coalfield in the North Island of New Zealand ; but two small fields have been discovered on the western side of the South Island.

S. America. Throughout the entire continent of South America only one coalfield of small dimensions has yet been discovered in the south of Chile.

Uses of Coal. Coal is one of the most valuable factors in modern civilized life. In countless ways it is related to our daily lives. Its first and foremost use is as a fuel, and hence as a source of power. Railway trains for the most part are drawn by coal-burning engines ; it is extensively used in steamships ; many of the mills and plants are driven by the power generated by it. In fact, the leading producers of coal are also the leading industrial countries of the present-day world. Coke is produced by partially burning coal, and being harder than the latter it makes a hotter fire. That is why coke is largely used in the smelting of iron. The gases given off at the time of the production of coke are collected and used in the manufacture of coal-tar, dyes and various chemicals and drugs.

Although the United States is by far the biggest coal-producing country in the world, she does not generally export it ; for she has had to consume nearly all of her production ; and even if she at times exports a comparatively small amount, at others she also imports a small quantity.

In the export trade of coal, the United Kingdom easily leads. The situation of the coal-fields near the sea-board helped the expansion of coal export trade. Actually coal forms nearly four-fifths of the bulk of outward cargoes from Great Britain. Coal forms the only bulky commodity for export from the country, which in the main has exports that are far less bulky than the raw materials and foodstuffs that are imported. By enabling ships that would otherwise go empty to carry a cargo, it has helped to reduce freights on inward cargoes and so has enabled the general population to get its food-stuffs and manufactured goods to get their raw-materials at the lowest possible costs.¹ The quantity and value of coal exported have decreased greatly in recent years because of increase in production in many countries and the increased use of oil and electricity in place of coal. Other coal-exporting countries are Germany, South Africa, Poland, etc. etc.

Petroleum.—As has been mentioned in a previous chapter, petroleum or mineral oil occurs in the younger sedimentary rocks. Sometimes, however, it is found in comparatively old rocks which are not quite 'ancient' and are, of course, sedimentary or stratified. It is often called rock-oil, and in fact, that precisely is the meaning of the word petroleum (Latin *petra*=rock, *oleum*=oil). As the bodies of plants and animals begin to decay, hydrogen and carbon are given off. When these decay on the land surface, the gases mix up with the atmosphere. But in case this process of decay takes place under mud or sand beds, the released hydrocarbons, being unable to pass into the atmosphere in the gaseous state, are stored up. This decay, as well as the conversion of the organic matter into oil, takes place as the result of bacterial action. And as a

Sources.

Origin.

¹ Buchanan—Economic Geography of the Br. Empire.

Geological
condition
for
storage.

rule, it is where the organic substances were deposited in brackish water, *i.e.*, between fresh and salt waters, that the conversion of them into oil seems to have been possible. That is why mineral oil is largely found in old delta deposits. Gas, oil and salt are often found in association. As might be expected, the gas is at the top and salt at the bottom with the oil in between them. The necessary geological conditions for the storage of oil in nature are (a) a porous stratum of sandstone or shale to the oil, and (b) impervious layers both above and below to prevent the escape of oil. Like coalfields, these 'oil pools', or more precisely the beds of sand and clay, are folded by earthquakes, and although such movements are generally unfortunate for coalfields, they have ordinarily just the reverse effect on oil pools ; for the beds which contain oil also contain water, and oil being lighter than water floats on the latter, and where, as a result of earthquakes, the beds are steeply inclined, the oil naturally rises to the crests of the arches.

Uses.

Crude petroleum is a complex chemical substance, and varies greatly from one region to another in composition. These may, however, be roughly divided into two types: (1) the oils with a paraffin base and (2) those with a base of petrol. Thus these two products are obtained from the crude oil by distillation. But petrol and paraffin do not exhaust the list of products obtained from the crude oil. Kerosene, gasoline, vaseline, benzine, asphaltum and other things are produced from crude petroleum. The use of kerosene as an illuminant is well-known. As late as the middle of the last century the chief source of illuminants was animal fat ; despite the apparent preponderance of electric light, kerosene still holds the first place as an illuminant even in America and Western Europe. Railway locomotives in some parts of the world, particularly in the U.S.A., are driven by the power generated by the burning of kerosene. Some of the ships also use it instead of coal. It also provides the source of heat for millions of dwellings in Europe and America. And in most cases petroleum serves as a substitute for coal ; it is cleaner and some-

times, though not in all cases, less expensive than coal. And although petroleum is now commonly regarded as a source of fuel for automobiles it has been well said that "the whole development of our machine civilization has been made possible only by the use of petroleum lubricants." The lubricants manufactured from vegetable oils and animal fat could meet the needs of the slow-moving machinery of the pre-industrial age ; but the high-speed and high-temperature machines of to-day quickly decompose these vegetable and animal oils, and only the lubricants of mineral oils are suited to them.

The relative importance of the principal producers may be studied from the following table :

The Leading Producers of Petroleum

1931-35		1952	
Country	p c	Country	p c
U. S. A.	.. 59	U. S. A.	.. 55
U. S. S. R.	.. 12	Venezuela	.. 17
Venezuela	.. 8	U. S. S. R.	.. 9
Rumania	.. 4	Iran	.. 7
Iran	.. 3	Iraq	.. 3
Dutch E. Indies	.. 3	Mexico	.. 2
Mexico	.. 2	Indonesia	.. 1
Others	.. 9	Others	.. 6
Total 100		Total 100	

From all these figures we find that the U. S. A. is by far the most important producer of petroleum with a steady output of nearly two-thirds of the world's total. Of the U. S. A. huge output of the U. S. A. about 70 p.c. comes from the three states of Oklahoma (25%), California (24%) and Texas (21%) ; other important centres of production in the country are, in order, Kansas, Louisiana, Wyoming, Illinois and Kentucky. At one time Mexico was one of the Mexico. first-rank producers ; But she has fallen far behind now. South America, so very deficient in coal resources, holds an important place in respect of oil production. Especially important is the output of Venezuela, which has chief oil

Venezuela and other South American States.	centre near about the Gulf of Maracaibo. Other important oilfields of South America are in Colombia, Ecuador, Peru, Trinidad (Br.), and the Argentine. Canada in North America is not yet known to have any very important
Canada.	oilfield, although she is by no means devoid of small oil pools, and in recent years she has been steadily increasing her output.
Europe.	Europe as a whole is rather deficient in mineral oil resources. Her only important oil centres are in Rumania and Poland. There are, however, lesser oil pools in Germany in Hanover, and France produces a little oil from her oil pools at Pechelbronn. Of all the European countries
Rumania and Poland.	Russia is by far the richest in oil resources. There are big oilfields on both sides of the Caucasus chain especially in Grozny and Baku. Recently, again, another chain of new oilfields, running parallel to the Ural Mountains, has been discovered. These newly discovered fields do not, strictly technically, belong to Asia, because they occur, at least for the most part, on the European (Western) side of the Urals.
Germany and France.	
Russia.	
Asia.	In Asia the oilfields of Iran (Persia) are believed to be 'enormously important'. Quite near these there are the newly developed fields of Iraq, and still more recently there has been discovered an oilfield on the southern shores of the Persian Gulf ; this was discovered only in 1935. From these oilfields of what the westerners call the Near East we are to proceed eastward till we reach the small oil pools of the Punjab ; again travelling farther east we come to the oilfields of Assam. Proceeding still farther we reach the important fields of Burma. We have been travelling from Iran in a general south-easterly direction ; from Digboi, Assam, we take a more decidedly southerly turn onward while keeping all the times towards the east, and thus we reach the oilfields of Java, Sumatra and Borneo in the East Indies. By the time we reach Borneo our direction has changed northwards, and proceeding along that direction we come to the oilfields of Japan. These are not so big as those of Burma or the East Indies, and the
Persia and Iraq.	
India.	
Punjab and Assam.	
Burma.	
East Indies.	
Japan.	

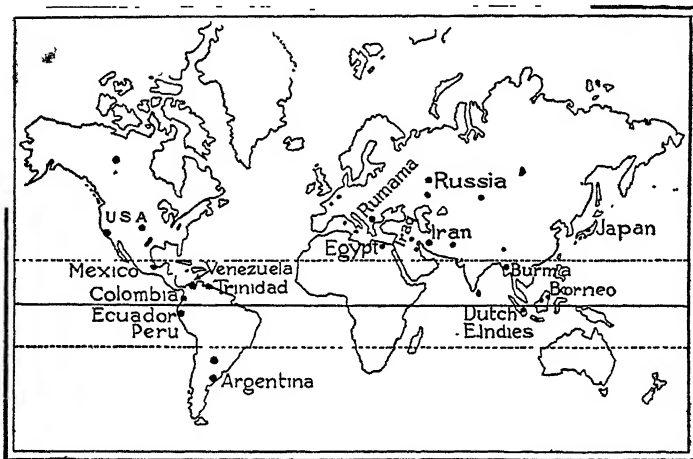
small output of Japan is quite insufficient for her home requirements.

As the map of petroleum production shows, Africa's share of oil is quite insufficient. That big continent has only a few small fields on the shores of the Red Sea in Egypt. But the continent of Australia is even more unfortunate ; no oilfield has yet been discovered there.

Egypt.

Australia.

Many of the great oilfields have been remarkably short-lived, particularly in America, having reached their maximum output in two or three years of their discovery



World Production of Petroleum

and then declining quickly. Thus the world depends largely upon the continued discovery of new fields for its huge requirements of petroleum. And although the exhaustion of the world's oil reserves is by no means imminent, geologists are fairly well agreed that the exhaustion will come long before any shortage of coal occurs,—indeed it would be no surprise if the production of oil shows a marked decline within a few decades. All countries are at present practising a restriction on their output, and many of the countries are trying to produce oil on the present scale by the hydrogenation of coal, *i.e.*, Artificial Petroleum.

simple ; it consists in forcing hydrogen gas at high pressure to mix up with one of the constituents of coal and thereby effecting a change in the solid coal by way of its liquefaction into oil. Another way known as low-pressure carbonisation is to convert coal partly into coalite, a kind of smokeless fuel and partly into oil. Still there are other methods of producing petroleum. One of these is to extract oil from oil shale. This is possible because oil shale contains some amount of oil in the form of minute globules. The shale is heated in a closed vessel usually of glass with long downward-bent neck called a retort, and the oil globules are converted into gas which, when collected and cooled, condenses to be reconverted into oil. But all these processes are as yet more or less expensive, and do not generally pay ; the oil obtained from wells is much cheaper. Moreover, it has been calculated by experts that "to produce oil on the present scale by the hydrogenation of coal would mean increasing coal production by about 50 per cent and would involve immense capital investment.....Therefore, oil will be produced mainly from wells until scarcity forces reliance on higher cost alternatives."¹

Trade in
Petroleum

The U. S. A., despite her enormous output, can spare but little for export. Her production and consumption of oil are very nearly on a par, and actually she does import a considerable amount of crude oil. But this is not so much for home consumption as for the purpose of exporting the oil to other countries after refinement. The chief oil exporting countries besides U. S. A., are the islands of S. E. Asia, Burma, Venezuela, Iraq, Iran, Trinidad, Mexico etc. The U. S. S. R., busily engaged in expanding her industries consumes virtually her entire output at home. The chief importers are the countries of Europe, specially Great Britain, France, Germany, Belgium etc. Other importers are India, Japan, China, Australia etc. Less than one third of the world's annual output, on the average, of Petroleum, Crude or refined, enter into the channels of international trade.

¹ C. K. Leith, *World Minerals and World Politics*, p. 33.

Natural Gas.—Natural gas, like petroleum, is of organic origin, and is, therefore, found associated with the latter. In the early days of the oil industry little heed was paid to this valuable product of nature, and enormous quantities have thus been allowed to waste. The gas underground is often under great pressure, and any faulty method of drilling is liable to release the gas which then gushes forth with mad violence. Even in the exploitation of an oil well it is essential to keep the gas underground ; for it exerts pressure and forces the oil up the well. The gas is generally collected by means of pipelines, and because of the natural pressure it can be easily forced to distant markets. A pressure of anything between 450 pounds to 2,000 pounds is not uncommon.

Natural gas is a perfect fuel, and can, therefore, be harnessed in the service of various manufacturing industries. At present it is largely used in the glass and the iron and steel industries, besides being used extensively as an illuminant. It seems to be a formidable rival of coal, and may, in near future, set up a great revolution in the coal trade. But again, a steady supply of natural gas on a large scale, like that of petroleum, seems to be only temporary, and certainly the length of life of any given gas field is problematical. At present, however, much more of natural gas is converted into gasoline than is used in the natural form. Uses.

The U. S. A. is naturally the leading producer of natural gas. She is also the chief consumer. In that country there are more than 55,000 gas wells and above 165,000 miles of pipelines for its distribution. The exploitation of natural gas on an extensive scale is, however, a very recent affair ; but the industry has been expanding by leaps and bounds since 1921. Other important producers are Russia, Italy, Canada, the United Kingdom and Hungary. Production.

Water-power.—The conversion of falling water into mechanical energy is one of the earliest achievements of man. Water-power is now utilized more in the form of

Utilization.

electrical energy than as a mechanical agency pure and simple, and this energy can now be transmitted easily to a distance of 300 miles from its base. The extreme limits to which it can be transported have, however, been calculated at 400 to 600 miles overland. Thus it is an actuality to-day to *export* water-power like any other commodity, although we cannot yet export it over vast stretches of water. New Zealand, for example, cannot at present export her surplus water-power over the sea to Australia, while water-power is now frequently transmitted overland from its source in the U. S. A. The electric turbine, again, renders it possible to utilize the entire energy derived from even the mightiest falls. Moreover, water-power is much more widely distributed than either coal or oil. Flowing water is very nearly an inexhaustible source of power, whereas coal and oil, though abundant, are strictly limited. Electricity can be derived from steam as well as flowing water. The relative importance of steam-electric and hydro-electric energy varies in different regions ; countries with abundant fuel resources find it easier to make use of the former, while in regions rich in rapids and falls but poor in fuel it is easier to make use of the latter. Thus in Northern Germany, where coal is fairly abundant, steam is the major source of electric energy ; but in Norway, where there is a scarcity of fuel, falling water is practically the only source of electric energy. In the U. S. A. about one-third of the total electric energy is derived from falling water.

Conditions of production.**Distribution of Water-power :****(1) Africa.**

In order to obtain a large and dependable supply of water-power from the rivers of a region three conditions are necessary : (1) there must be abundant rainfall (2) stream-flow should be uniform and the volume of water carried should be constantly heavy (3) there should be sufficient scope to provide a good head or fall of water. Of all the continents Africa ranks first so far as her potential water-power resources are concerned ; it has been estimated that she possesses about 190 millions of horse-power, approximating 40 p.c. of the world's total. To employ this huge power is to derive a benefit from the employment of about 1,330 million men, since the power of

an ordinary man is supposed to be one-seventh horse-power. But Africa is the most backward of all the continents so far as the exploitation of her potential power resources is concerned. The total actually employed falls far short of even two million horse-power. The development of these vast water-power reserves of Africa even for the promotion of home industries will, in all probability, take generations. Africa seems to have very great possibilities in the future, and this enables us to understand, to some extent at least, the rivalry of the Western nations for the possession of this 'Dark Continent'. Asia comes next to Africa in her (2) Asia, potential water-power resources, with a total of about 75 millions of horse-power. But her developed power scarcely exceeds 5 millions of horse-power, although she contains nearly a third of the land area of the earth and supports more than half the total population of the world. The total turbine installation of Asia is less than that of Norway or Italy. North America is a close rival of Asia (3) North America, so far as potential power reserves of the two continents are concerned ; but she ranks first in point of actual development of these resources, with a total well exceeding 20 millions of horse-power. Yet it cannot be said that the turbine installations in North America are uniformly distributed all over the continent. The fourth place in potential power reserves is occupied by Europe, with a total just (4) Europe, short of 60 million horse-power. In point of actual development her figure is just short of 20 millions of horse-power. Thus North America and Europe together share more than 95 per cent. of the world's total output of hydro-electric power of which the U. S. A. and Canada account for nearly half. Next comes South America with a total reserve con- (5) South America, siderably above 40 millions of horse-power ; but her actual output is between 2 and 3 millions of horse-power,—a figure that gives her the fourth place in this respect. Last of all comes Oceania with a total reserve of about 18 million horse- (6) Oceania, power, and, though her actual output of energy does not exceed 2 millions of horse-power, she may be given the fifth place (the sixth place being occupied by Africa) in this respect. To sum up, the countries which have developed

their water-power resources are the U. S. A., Canada, Italy, Japan, France, Switzerland, Germany, Sweden, Norway, Spain, Australia (particularly Tasmania), and New Zealand. It is fairly accurate a generalisation to say that, hilly and mountainous regions, especially those where rainfall is constant or abundant, possess large amount of potential water-power resources, and that since coal and oil are not found in very mountainous tracts, such countries have generally been obliged to develop their water-power resources for industrial purposes. The British Isles as a whole is rather poor in water-power reserves and most of her electricity is derived from the use of coal, although water-power is utilized in the Highlands, the southern uplands of Scotland and Wales ; the Irish Free State, where there is a great scarcity of coal, has, however, the largest hydro-electric installations in the British Isles near Limerick on the River Shannon. Tasmania and New Zealand are making use of their water power reserves at a very high pace, and as late as in 1935 a start was made to utilize the famous Victoria Falls of Africa.

QUESTIONS

1. Make a list of the principal materials used as fuel. What is the chief fuel in your locality and why ? Where does coal and petroleum used in your locality or your vicinity come from ?
2. What are the leading countries in (a) coal reserves, (b) coal production and (c) coal export ? Account for your answers.
3. Briefly describe the world distribution of coal with special reference to its economic importance.
4. In what conditions may a coal mine be of greater value than a gold mine ? Illustrate your answer by reference to the coal mines of Great Britain and Germany.
5. Name the countries from which coal and petroleum are exported.
6. Give an account of the world distribution and present production of natural oil.
7. What are the leading countries in (a) petroleum reserves, (b) petroleum production and (c) petroleum export ? Account for your statements.
8. What are the liquid fuel producing countries ?
9. Examine and estimate the coal and petroleum resources of the U. S. A.

10. What are the essential geographical factors for the development of water-power? Give a few examples from particular countries.

11. Name any four countries where water-power is principally used. Explain the special circumstances in each country favouring its use in preference to other forms of power.

12. Examine and estimate the water-power resources of Africa.

13. Discuss the nature of (a) supply of, (b) demand for, natural petroleum in the continent of Europe during (a) normal times, (b) a war. What is the share or substitute products in the total consumption of this fuel and from what are these obtained?

14. Describe briefly the distribution of mineral oil outside the U. S. A.

CHAPTER VII

THE EXCHANGE OF COMMODITIES

Interchange of products between the different communities of the world is known as commerce. Man first bartered a few products with his neighbours. As his knowledge of other peoples and of different products grew he began to trade across political boundaries. From this humble beginning has developed the immense and complex international trade of the present day. Inventions, improvements in agriculture, industry and transportation have brought about the changes in the character and commodity make-up of the world. Commerce arises from the difference in the production of communities in different parts of the world due to (1) difference in the natural resources of different lands, (2) differences in population, (3) differences in the stages of industrial development.

Thus foreign trade is the result of international specialisation. Each country produces the commodities which it is best suited to produce and exchange its surplus for those goods which it can not produce. Specialised agriculture and manufacturing industries are inconceivable without trade and trade cannot be developed without transport. The factory system requires the collection of a

wide range of raw materials drawn from different parts of the world and a vast number of workers. The finished products must be carried away to the markets. All these demand a highly organised transport system.

Its influence
on com-
merce.

(1) En-
hancement
of pro-
duction.

(2) Geogra-
phical
division
of labour.

(3) Com-
mercial co-
operation
and co-
ordination.

The influence of transportation on the expansion of the commercial world can hardly be overstated. It has acted as a *fillip to production*. Several commodities, formerly considered luxuries, are now regarded as necessities in the daily lives of men and women all over the civilized world. In the past people lived mainly unto themselves ; they produced their own food and clothing and manufactured their own implements, and thus strove, as far was practicable, to be self-sufficient within their respective communities. In many cases, however, such articles could be made more economically elsewhere ; but there scarcely existed any efficient and cheap system of transportation to facilitate economical production and distribution. Consequently nothing like the geographical division of labour we see to-day was then in evidence. With the development of modern forms of transportation it has now been possible to deliver the necessary raw materials cheaply and easily at the plants for production, and the finished products can also be as easily and cheaply distributed to the consumers abroad. Transportation has thus favoured the *geographical division of labour*. Thus in our own country, which is by no means commercially much advanced, cotton growing has developed mostly in the south-central regions, jute growing in Bengal and the neighbouring parts of Bihar, Assam, and Orissa, tea production in Assam, Northern Bengal and the Nilgiris. In the U.S.A., admittedly a most progressive commercial country in the world, cotton growing developed in the south, the citrus fruit industry in the Mediterranean regions of California and Florida, wheat production in the Great Plains and the Spring Wheat Belt. This geographical division of labour, given proper scope, naturally leads to *commercial co-operation and co-ordination*, among different peoples. This is particularly the case in countries following some sort of planned economy under state direction as in the U.S.S.R. But even in capitalist countries large-scale

trade and commerce cannot proceed without a measure of willing co-operation among the traders or without some sort of co-ordination of the various industries.

Judged from the economic viewpoint, transportation is a part of production. For the latter consists in producing or creating, not material things, but utilities ; that is to say, production consists in making matter useful for consumption, in imparting to it the ability to satisfy wants. To do this two things are essential: matter must be given form or qualities suitable to satisfy some want, and the article or commodity thus produced must be taken to the user. Agriculture, manufacture and the various industries by which things are grown and shaped impart to matter the form and intrinsic qualities which make it useful. Methods of transportation bring the commodity to the place where it can be used. The usefulness of a thing depends not only on the intrinsic utilities of form or quality, but also on its location—its '*place utilities*'. These '*place utilities*' are created by the transportation services. Transportation is thus a part of the general process of production.¹

Nature of
Trans-
portation.

Trans-
portation
as part of
production ;
it creates
place
utilities.

Transportation also helps increase the rent or income derived from the land or other natural resources. Such rent or income depends upon two primary factors—the productivity or intrinsic characteristic of the land or resources of nature, and their location. It is with respect to location that transportation is of such importance.²

A study of the important cities of the world will clearly reveal the importance of transport facilities to urban development. Most of these cities are located on marginal positions between land and sea or inland waterways or land routes, and are, therefore, easily accessible from various parts of the country. Delhi, for example, is situated in the heart of the great Indo-Gangetic plain ; from it radiate vast routes to different parts of the Indian sub-continent,

¹ E. R. Johnson & T. W. Van Metre, Principles of Railway Transportation, p. 3.

² Op. cit., p. 5.

and its occupation means easy access to various parts of the country. Calcutta, located on the Hooghly (Ganges), not far from the sea, and connected by railways with all parts of India, has become one of the largest ports of the world. London, New York, Paris, Tokyo, Berlin, Chicago, Shanghai, Buenos Aires, Moscow, Philadelphia, Osaka, Vienna and most of the other leading urban centres of the world hold similar strategic positions and owe much of their development to transport facilities.

Modes of Transportation.—The modes of transportation are not the same throughout the world. These have been classified by Stamp into seven categories¹ :—

1. Human portorage, including the wheel-barrow and like devices.
2. Animals, used (*a*) as beasts of burden and (*b*) for draught purposes.
3. Roads, used by motor cars, lorries, &c.
4. Railways, including (*a*) railways proper and (*b*) tramways &c.
5. Inland waterways—rivers and canals.
6. Ocean transport.
7. Air transport.

Its import-
ance and
causes
thereof.

Case of
S. E. Asia
and
E. Africa.

1. **Human portorage.**—More than half of the world's population still depend upon human energy as the major motive power in the local transportation of goods. This has been attributed to various causes—political, social and industrial backwardness, economic disabilities, density of population, relief and climate and so on. It is, for example, exceedingly difficult to build and maintain modern roads within the vast tropical forests ; in some parts of south-eastern Asia and particularly in China, human labour is cheaper than animal labour, because there is not only a scarcity of beasts of burden in these regions, but “every inch of the land (in Northern China) is so precious that the narrowest possible roads are used, such as will accommodate a wheel-barrow but not a two-or four-wheeled cart.”

¹ Chisholm's Handbook, pp. 77 sq.

In parts of the Eastern African uplands the tsetse fly makes animal transportation impossible, and so man is the chief carrier there. An idea of the prodigious labour expended by the 'coolies' in China may be obtained from the fact that "in the tea traffic between south-west China and Tibet... the normal load per man is 200 lbs., and two mountain passes more than 7,000 feet above the level of the starting-place have to be scaled, with about 120 miles to be covered in some twenty days."¹ The average carrying capacity of an Asiatic or African porter is, however, said to range between 55 and 66 lbs.; when handling a wheel-barrow it ordinarily mounts up to 250 lbs.²

2. **Animals.**—Where beasts of burden are abundant and the environmental conditions are unfavourable for the mechanization of overland transport, animals have largely replaced man as carriers. Even so, animal transport is still of great importance in the most mechanized countries of the West, especially in the rural districts, although mechanization of transport is tending more and more to displace it. In most of the European countries the **horse** is the most useful animal for draught purposes; but the **ox** is said to be more important in central and eastern Europe. In southern Europe, particularly in the Mediterranean regions, the **ass** is the most useful of all animals; he can live better on scanty herbage than the horse. In the mountainous parts of southern Europe, however, the **mule** is the best animal because of its sure-footedness and endurance. In Asia and central Africa the ox is preferred to all other draught animals and beasts of burden; in Asia the **buffalo** comes next. Neither in Asia nor in Africa the horse is a first-rate domestic animal. **Reindeer** are practically the only draught animals in northern Asia, Europe and North America; they are wellknown for drawing sledges over the snow-covered ground. The Eskimos use the **dog** for the same purpose. The celebrated **yak**, a unique species of ox, characterized by long silky hair, takes the place of the mule in the mountainous parts of Central Asia;

¹ Chisholm's *Handbook*, p. 77

² Case & Bergsmark, *College Geography*, p. 646.

‘Carrying
capacity
of animals.’

goats and sheep are also sometimes used in these regions, and goat-carts are not unknown in the Alpine region of Europe. The llama is the most important beast of burden in the Andes of South America. The elephant is largely employed in south-eastern Asia—in India, Burma, Siam, Ceylon, Sumatra, Borneo, etc. In Africa they have ceased to train up elephants for labour. In India the government supervise over the catching of elephants for training. Amidst forest and marsh which cannot be traversed by any other domesticated animal, the lordly elephant is quite indispensable to man. In desert and semi-desert regions, again, the camel is even more indispensable than the elephant in the forest and marsh. No other animal carries so much merchandise than does the camel. The early colonists introduced this useful animal into Australia; but since motor-cars have been replacing him even from his old home, he has now been completely ousted from his adopted country. Animals are used both for carrying loads and drawing carts. Broadly speaking, one animal can pull at least four times the load it can carry. As for the horse it has been estimated that one capable of carrying 30 lbs., can draw a wagon load above 1 ton over a hard-surface road and the drawing capacity of a team of horses over a compacted, snow-covered surface is from 8 to 10 tons.¹ The use of wheeled vehicles, however, involves generally the making of suitable roads.

Roads in
‘clay areas.’

3. **Roads.**—Road-making was, until comparatively recent times, dependent upon the local supply of raw materials for construction. With the development of transportation this state of affairs has ceased; road materials are now brought from distant sources. On the other hand, transporation has always been dependent on good roads. Until comparatively recent times most of the roads in clay areas were difficult for dust in the dry season and for mud when rain would set in. This is still the case in many parts of the world, such as western Siberia, the plains of Hungary, Australia and the Argentine. Almost simultaneously with the overwhelming transformation of the

¹ Case & Bergsmark, *College Geography*, pp. 645-46.

system of transportation within the last 150 years, the art of road-making has also been revolutionized. Two Scotsmen, Telford and Macadam, were particularly responsible for this amazing change. Telford first conceived the idea of laying a solid stone foundation for roads and covering it with a layer of small broken stones ; this upper layer was made thicker in the middle so as to impart a slightly arched form to the road like the camber of a beam ; on each side of the road were provided adequate ditches for drainage. Macadam simplified the method by ignoring the costly stone foundation altogether. He began constructing roads by means of broken stones of uniform size, each piece an inch or two in diameter, and cambering the roads better for drainage. But with the advent of the automobile even this proved inadequate ; for the rapidly moving wheels provided with rubber tyres began to disintegrate the road materials by uplifting stones and scattering away the finer particles of dust which formed a natural cement. Then was invented the use of concrete and 'tarmacadam' (broken stones coated with tar). Of the several varieties of stone used in road-making limestones and close-grained igneous rock like basalt are said to be the most suitable. Another common road material is blast-furnace slag. Most up-to-date roads are admittedly unsuitable for horse traffic because of their smoothness: they are essentially motor roads.

Modern roads of Telford and Macadam.

Modern automobile roads.

Major road materials.

The total mileage of the world's highways is about 9,000,000 miles of which the U.S.A., alone possesses more than 3,000,000, miles. The densest network is in the Eastern Part. The U.S.A. leads in possessing the greatest mileage of improved roads without a close second. Canada has a road mileage of 395,000 miles. Southern part of the country is the most developed in this respect. The densest network of European highways occurs in the countries of north-western Europe from which the density of roads declines markedly to the east and south. France, Germany, Italy, and Great Britain lead Europe in the matter of road mileage. The U.S.S.R. has probably the second largest road mileage in the world. Motor transport roads are increasing

Road mileage in different countries.

here every year but it cannot challenge any comparison with the 30,000 miles of such roads possessed by the U.S.A. In Asia Japan, India and Java lead in possessing road mileage. Japan has more road per sq. mile area than any other country in Asia, and most of them are of improved type. India has about 285,000 miles of roads most of which are unmetalled. Considering the position and size of the country more road mileage is necessary. The five year Plan aims at improving the road mileage in India. In recently developed countries like Australia, New Zealand, Argentina, S. Africa and Brazil construction and use of highways for motor transport is undergoing significant development.

Motor
traffic and
road deve-
lopment.

The development of modern roads has been greatly stimulated by the growth of motor traffic. In 1940 there were in the U.S.A. more than 32,000,000 motor vehicles *i.e.*, roughly one for every 4 persons. In Great Britain in the same year there were some 2,500,000, *i.e.*, one for every 26 persons. The U.S.A. alone possesses half the world's total number of motor vehicles ; she has not only the largest number of cars and trucks, but also the largest number of cars in proportion to population. It is significant that in some of the sparsely populated countries like Canada, Australia and the Argentine the automobile plays a much more important part than in many of the European countries. The motor-omnibus has played an important part in the spreading of intercourse between urban and rural areas, and motor vehicles are now competing more and more with trams and railway trains. It has been predicted by many that in future motor vehicles will oust railway locomotives and trains altogether. But modern roads are still supplementary to the railways, acting primarily as feeders to the latter ; even in spite of the existence of trans-continental highways in the U.S.A., roads still act in that way. The fact is that motor traffic is cheap and more mobile than railway traffic, and is much better for short distance transportation.

Motor
traffic and
urban-rural
intercourse.

Motor
traffic
vs.
Railway
traffic.

4. **Railways.**—Railway transport is the best known and most widely used of all forms of land transport. For

long journey railways are quicker than water transport and they are less costly than motor transport. It is the best means of transport for carrying heavy and bulky goods over long distances at a relatively cheaper rate. The influence of topography on the construction of railway routes is much more obvious than on that of motor roads. ^{Topo-}
The railway-builder's problem is said to lie 'midway ^{graphy and} between those of the road engineer and the canal builder' ^{railway.}
Railway locomotives are incapable of ascending steep slopes ; an ordinary locomotive hauling more than its own weight on a gradient of 1:20 fails to work at all, and working becomes difficult if gradients of about 1:100 are frequently encountered. It has been found that the cost of running a given train-load over a mile of track on a gradient of 1:50 is double that of running it over a mile on the level. But trains can somehow be worked on gradients of 1:22. These are the reasons why railways do not generally run parallel to roads already constructed for the same destination. The railroad from Siliguri (Bengal) to Darjeeling has been constructed as a spiral line in order to lessen the gradient of the roadbed ; that from Bombay to the Deccan plateau follows a course of a series of zigzags for the same reason. In the hill section of the North ^{Railways in} Eastern Railway in Assam the lines have been pierced ^{mountain-} through the mountains in a number of tunnels. Various ^{ous regions.} novel types of railways have also been invented for running in mountainous regions. Wide stretches of water also often interfere with the construction of railways. These are mostly bridged over ; in some cases, again, train-ferries are used for the transfer of whole trains across the intervening water. The train-ferry system has long been in existence over the channel lying between Denmark and Sweden ; such ^{Train-ferry} communication has also been established between England ^{system.} and the continent *via* Harwich for ferrying goods trains across, and in 1936 the first passenger train from London was thus transferred to Paris *via* Dover-Dunkerque. Every inhabited country has a railway service, the extent of which depends on the degree of the country's economic and commercial development.

Some Important Trans-Continental Railways

1. **The Trans-Siberian Railway**, connecting Russia with the Far East. The original line runs from Vladivostok on the Pacific coast to Chelyabinsk in the west. It now connects Moscow and Leningrad with Vladivostok, Dairen, Peiping and Tientsin. The whole line is now a double-track system. With the completion of the **Hankow-Canton Railway** in 1936 it has now been possible (?) to travel from Calais to Canton by railway.

2. **The Trans-Caspian Railway**, connecting Central Asia with European Russia. It runs from Krasnovodsk on the eastern shore of the Caspian Sea to the heart of Turkestan, so important for cotton-growing, and thence to Moscow *via* Tashkent. It also throws off a branch towards the Afghan frontier from Merv to Kusk.

3. **The Orient Express Route** runs from Paris to Istanbul (Constantinople), connecting Munich, Linz, Vienna, Bratislava, Budapest, Belgrade, etc. The '*Baghdad Railway*' was destined to connect Baghdad by Mosul with Berlin; at present it runs from Konya on the west to Nisibin on the east, throwing off a branch to Alexandretta and another to Damascus, whence one line runs to Mecca, and a second, crossing the Suez Canal at El Kantara, proceeds to the Nile valley.

4. **The Cape-to-Cairo Route** was destined to connect South Africa with Egypt; the scheme was outlined by Cecil Rhodes; but it could not be worked out. At present one may go to Khartum from the Cape by railways and roads. Khartum is connected by rail with Wadi Haifa, whence one is to reach Shellal by river. From Shellal a train runs to Cairo.

5. **The Canadian Pacific Railway** connects the Pacific sea-board of Canada with the Atlantic sea-board. It runs from Halifax and St. John on the east to Vancouver on the west, connecting Quebec, Ottawa, Montreal, Winnipeg, Regina etc., on the way. It is the shortest of the trans-continental lines of North America.

6. **The Canadian National Railways**, formed by the amalgamation of the Canadian Northern, Grand Trunk, and Grand Trunk Pacific Railways, run across the North American continent partly through Canada and partly through the United States, connecting various important centres like Prince Rupert, Portland, Moncton, Winnipeg, Quebec, Chicago, Buffalo, etc.

7. **The Union and Central Pacific Railroad**, the first trans-continental system north of the Isthmus of Panama, connects Chicago (and, of course, New York) with San Francisco. It lies entirely within the U.S.A.

8. **Western Pacific Railroad**, also in the U.S.A., is another trans-continental system opened for freight traffic only. It is much longer than the Union and Central Pacific.

9. **The Northern Pacific Railway** runs from St. Paul some 400 miles north-west of Chicago, to Tacoma on Puget Sound and Portland; it has connections with New York and Philadelphia as well.

10. **The Great Northern Railway** also has St. Paul for its eastern terminus and runs to Seattle on Puget Sound; it, too, has connections with New York and other important centres.

11. **The Southern Pacific Railway**, runs from San Francisco to Washington and New York through the southern states of the U.S.A., throwing off branches towards Mexico.

12. **Atchison, Topeka and Santa Fe Railway** has established connections between New York and San Francisco by way of St. Louis. Like the Southern Pacific it also passes through the southern half of the Valley of California.

13. **The Chile-Argentine Railway** connects Buenos-Aires with Valparaiso. It is the most important of the four trans-continental railways of South America.

The development of **Tramways** began in the last quarter of the nineteenth century. The early tram-cars

were mostly horse-drawn vehicles ; the use of electric power came later on. At present tramway companies are finding it hard to compete with 'the more flexible motor-omnibuses'. In some countries 'trolley buses' are being used instead of tram-cars ; these are driven by electricity, but require no rails. The large number of privately owned motor-cars have rendered the street-car system very nearly useless in America.

Revolution
in water
transport.

5. Inland Water Transport.—The use of inland waterways given by Nature has been known to man since the dawn of history. Even the construction of artificial waterways was not unknown in pre-Christian times. Yet water carriage has been revolutionized only within the last hundred years or so ; it began with the introduction of the steamboat in the early years of the last century.

Water
carriage
vs.
Land
carriage.

In some countries water carriage is much more important than land carriage. The large navigable rivers of the East have always provided splendid means of access to inland regions, and many canals have been cut from them both for irrigation and transport. The intricate network of canals in China would, if spread along in a continuous line, coil round the entire globe seven or eight times. This, coupled with the fact that the earliest civilizations almost invariably flourished in one or other of the large river valleys of the East, has led many to suppose that water carriage is more advantageous than land carriage. It is certainly cheaper, because large navigable rivers and lakes provide ready-made highways that cost little to maintain. But this is not true even of all kinds of waterways provided by Nature ; not only canals but canalized rivers also cost a good deal.¹ Water carriage is, moreover, slow and

¹ It is often rather erroneously assumed by many that inland water transportation costs less than railway transportation. But when cost of construction and maintenance of canals and canalized rivers are taken into account, the reverse appears to be correct. In the U.S.A. inland water transportation has been found to cost 40 p.c. more on the average than railway transportation. The story is much the same about inland transportation in Europe as well. See H. G. Moulton, "Economic Aspects of Inland Water Transportation." *American Journal of Geography*, Vol. XV, pp. 78 and 112.

uncertain. Many of the rivers are, again, useless for navigation, and even good navigable rivers mostly flow for long stretches through marshy regions devoid of landing places. Rapids and falls are almost insurmountable barriers to navigation ; rivers which are subject to great variations in level, as most of them actually are, do not offer good transport facilities all the year round. In wintry regions, again, the stoppage of river traffic through ice in winter is the rule rather than the exception. Thus nearly all the rivers of Peninsular India become unnavigable in the dry season on account of low water and inadequate draft. Of the three great rivers of China only the Yangtze Kiang is ideal for navigation ; the Hwang-ho is too rapid, too shifting and too much obstructed by shallows, and the Si Kiang, though navigable for a long distance from its mouth, has several rapids to impede navigation. The great Mississippi of North America flows for miles at long stretches without landing places. The mouths of the rivers of Siberia, flowing towards the Arctic seas, remain icebound in winter. All these considerations inevitably suggest the superiority of railways to inland waterways, especially to rivers. "..... It should now be recognised," writes Stamp, "that nature has generally done more for a country in providing it with facilities for railway construction than with navigable rivers, in so far as these are merely waterways....."¹

The most important thing about a river is its accessibility to sea-going vessels ; a river that is not directly accessible to these vessels, *i.e.*, one that cannot be used as a natural extension of the sea-board is not of any great value for transportation ; inland communication can be better served by railways. The only disadvantage about railways is that of costlier haulage ; but this is more than well balanced by speed and ease of intercommunication with different parts of a country. A railway is said to have a great advantage over a river even on a parallel course, as the lines running through the Indo-Gangetic Plain well demonstrate. Yet rivers are very useful—indeed almost indispensable—for the transportation of bulk freight at low cost. A train load of

Rivers and
railways.

¹ Chisholm's Handbook, p. 87.

7,000 tons, for example, is generally considered unusual, but barge-trains frequently carry much more without any fuss. This carrying of bulk freight (great quantities at one time) at low cost¹ has been described as the special 'economic mission' of inland waterways. And it is of prime importance in densely populated regions with a superabundance of raw materials, and "in countries not yet fully opened to modern commerce." Inland waterways often act as feeders to railways as well.

Canals and
Lakes.

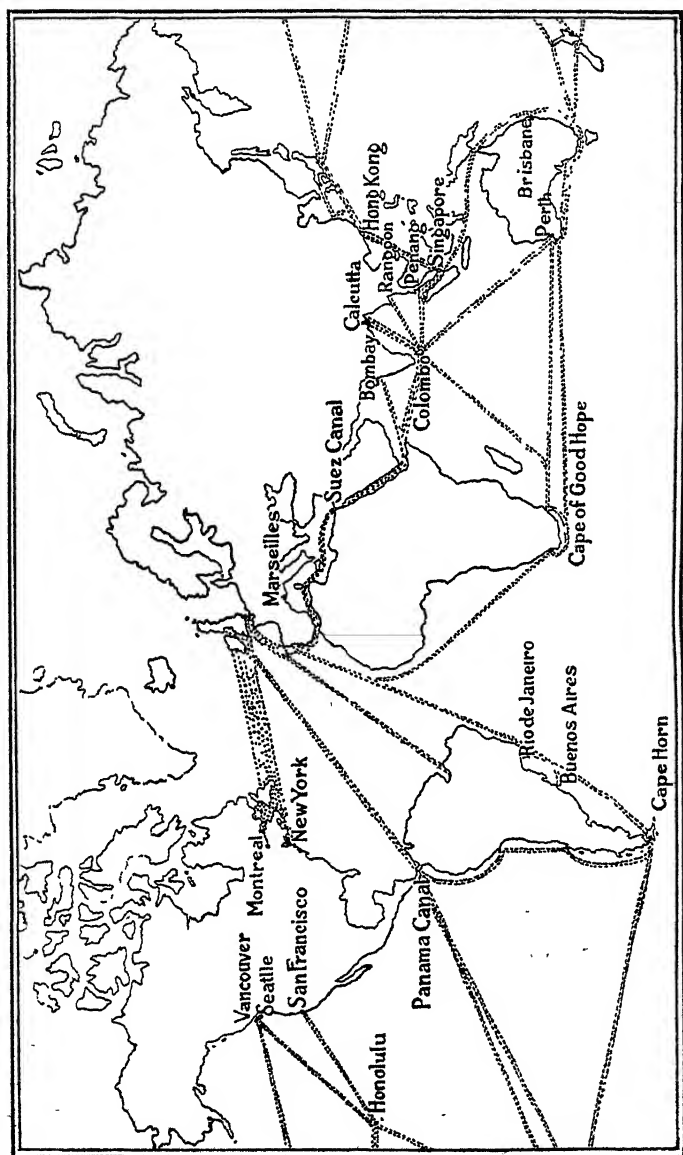
Another use of rivers is to feed navigable canals. With the introduction of railways, however, the importance of canals for navigation has greatly diminished. But the 'ship-canal' have, on the contrary, assumed enormous importance with the expansion of marine navigation. Lakes are, however, very important for inland water transport. Lake waterways are beyond comparison cheaper than either navigable canals or railways. It has been estimated that on the Great Lakes of North America, for instance, a ton of traffic may be transported to a distance of 1,250 miles for a dollar as against only 127 miles on the railways for the same sum.² This is not surprising at all, since lakes are ready-made highways costing next to nothing for upkeep. Such is also the case with other great lakes like the Caspian Sea, Lake Geneva, Lake Constance, Lake Titicaca, all of which are more or less important commercial routes.

Ocean
transport
and world
trade.

6. Ocean Transport.—The bulk of modern international trade is sea-borne. Ocean transport is vital to world commerce. Without it the varieties of products of different regions of the world could not be exchanged at all in some cases, while in others the exchange would be so difficult as to render the development of an extensive international trade on a world-scale impossible. Before the

¹ This may be perplexing. But while the railway meets all its own costs by charging high, part of the costs in the case of water transport—such as the cost of construction and maintenance of canals etc.—are met by the government. Its freight charges are, therefore, comparatively low. The balance is paid by taxpayers.

² H. G. Moulton, "Economic Aspects of Inland Water Transportation," *Journal of Geography*, Vol. XV, p. 77.



Ocean Trade Routes (I)

beginning of the christian era Indians, Chinese, Phoenicians, Greeks, Carthagians etc., were well versed in ocean navigation but then sailing vessels were only used. These depended on prevailing winds and ocean currents in their voyage and hence such voyages were fraught with dangers and difficulties. So these vessels have been practically ousted from the seas with the introduction of coal and oil burning giant ships.

Liners and
Tramps.

Nevertheless sailing-vessels and small crafts for the navigation of the sea have not totally died out yet ; the islanders of the Pacific Ocean still undertake pretty long voyages in small boats, and larger sailing vessels owned by Europeans sometimes ply the 'seven seas' even today. But for all that these must now be regarded as exceptional. Modern seagoing vessels are classified as **liners** and **tramps** (unless, of course, they belong to the military marine) : a liner is a ship that plies regularly between foreign ports and usually carries certain specified types of products only ; a tramp is a drab general cargo ship, lacking in fixed routes and regular sailing schedules and goes from port to port in response to offers of cargo at what it considers to be sufficiently attractive rates. The liners are adapted to the nature of the trade and make for specialization. Because of their speed and regularity liners now carry 80 per cent. of the total ocean traffic, while tramps specialize in the transport of bulk cargoes like grain, coal, fibre, timber, etc. Sailing-ships are also used in carrying bulk cargoes, but they are rapidly declining in number.

Advantages
of ocean
transporta-
tion.

Ocean transportation is said to possess the greatest combination of advantages : it shares the advantage of cheap haulage for low speeds with water carriage of all kinds ; sea routes, unlike roads, railways and canals, cost nothing to maintain ; the ocean is free to navigation (except, of course, the so-called 'territorial waters') and can be traversed in all directions ; it imposes no limit to the increase of the size of vessels (although, apart from cost of construction and repair, the size of vessels is limited by accommodation available at ports and the dimension of

ship-canal). All these advantages are said to outweigh the great risk of loss at sea than on land from storms and the like.

But though the oceans are traversable in all directions and they cover nearly three-fourths of the earth's surface, definite routes of travel have been established across them ; beyond these 'sea lanes' and 'trade routes', as they are called, the vast expanses are completely deserted. Several factors have naturally played their respective part in determining these lanes and routes. The first principle of ocean navigation is to take the shortest cut between two places as far as practicable. Owing to the sphericity of the earth such a route is always the arc of a great circle, of which the centre of the earth is the inevitable centre. This sounds simple enough, but it is not so simple as it appears at first sight. The earth, we know, is not a sphere, but a spheroid. So, where it is a north-and-south route, the shortest cut lies along a meridian ; but where the route is from east to west or the reverse, the shortest cut deviates from the parallels of latitude in proportion to its distance from the equator ; it is only on the equator that it lies along a parallel of latitude, *i.e.*, along the equator itself. Since these parallels are shorter and shorter towards the poles, the shortest of the east-and-west routes in the Northern Hemisphere deviates most in a curve towards the north from the parallel connecting places at the ends of the route : in the Southern Hemisphere it deviates farthest towards the south. But this principle has to be modified by certain other considerations. There may be land in the way on a great circle route (shortest cut), and this may cause considerable deviation. So also does the climate of a region cause deviation from a great circle course. The circle route from Cape Town to Wellington (New Zealand) lies to the south of the Antarctic Circle, but the actual passage of ships takes a more northerly route. Coaling stations and oiling-bases, again, oblige ocean-going vessels to modify their routes sometimes, but these are situated along the great curve routes as far as practicable. Ocean currents and winds are also important factors in determining sea lanes

Ocean
Trade
Routes.

Factors in
determining
ocean trade
routes.

and trade routes, but these concern the sailing-vessels, modern steamers being practically independent of them.

The Principal Ocean Routes of the World

Connecting Western Europe with Eastern U.S.A., Canada & Mexico.	<p>1. The North Atlantic Route.—Of all the ocean routes this is the busiest, connecting, as it does, the two leading commercial regions of the world—Western Europe and Eastern United States.¹ Various other ocean lines issuing from the numerous ports on the Atlantic coasts of Canada, the U.S.A., Mexico and the islands of the West Indies converge into the North Atlantic Route, and on reaching the European side of the Atlantic Ocean it splits into separate lines to reach the different ports of Western Europe. For European vessels the principal ports of departure are London, Liverpool, Southampton, Glasgow, and Bristol in Great Britain ; Dublin, Cork, Waterford and Limerick in Ireland ; Marseilles, Le Havre, Rouen, Dunkerque, Bordeaux, La Rochelle, Nantes and Cherbourg in France ; Antwerp, Ghent, Ostend and Bruges in Belgium ; Amsterdam and Rotterdam in Holland ; and Hamburg, Bremen and Emden in Germany. Ports of call are New York, New Orleans, Galveston, Philadelphia, Boston and Baltimore in the U.S.A., and Halifax, St. John, Montreal and Quebec in Canada. Eastbound traffic over this route still consists mainly of raw materials like wheat, paper and pulpwood from Canada and cotton from the U.S.A., whereas west-bound traffic consists mainly of manufactures ; but this ‘unbalanced traffic’ is gradually disappearing as more manufactured articles are now being exported to Europe from the U.S.A. instead of an overwhelming proportion of raw materials, especially cotton. In the foreign trade between the U.S.A. and the U.K. on the eve of the Great War II, the export of the U.S.A. exceeded more than twice as many tons of goods as she used to import from the U.K., and her exports to continental Europe exceeded her imports therefrom by more than a million tons annually. The War</p>
Chief ports.	
Nature of commerce.	
Present revolution.	

¹ Half the world's shipping (approximately) is engaged in the North Atlantic.

completely turned the balance of this unbalanced trade the other way about.

2. The Mediterranean Trade Route.—Next to the North Atlantic Route, this is the most important ocean route in value and volume of traffic. It extends through the Mediterranean Sea, the Suez Canal and the Red Sea. The Suez Canal may well be described as the meeting-place of the East and the West as well of the North and the South : it is where all the European and North Atlantic lines converge with those from East Africa and the Far East and also with most of the lines from Australia and New Zealand. The Mediterranean route, therefore, interconnects such regions as differ markedly from one another in commercial products and economic activities. Westbound traffic over it consist of a rich variety of raw materials and foodstuffs like jute, silk, rubber, skins, leather, tea, coffee, rice, wheat, sugar, meat, spices, indigo, tin, timber, etc.; eastbound traffic consist almost solely of a great variety of manufactured articles, especially cotton piece-goods and machinery. This is perhaps the most glaring instance of unbalanced international trade. Principal ports to the west of the Suez are London, Liverpool, Southampton, Manchester, Glasgow, Bristol, Rotterdam, Hamburg, Marseilles, Lisbon, Genoa, Naples, etc.; to the east chief ports are Bombay, Calcutta, Rangoon, Singapore, Colombo, Aden, Hongkong, Shanghai, Nagasaki, Yokohama, Manila, Adelaide, Sydney, Melbourne, Durban, Zanzibar, Mombasa, Mozambique, etc. The chief coaling-stations on the route are Gibraltar, Marseilles, Algiers, Port Said, Colombo, Singapore, Batavia, Hongkong, Shanghai, Nagasaki and Yokohama. Many of the coaling-stations are also important *entrepôts*. Eastbound vessels land many goods at Gibraltar for ports on the Mediterranean at which they do not call or for ports on the Black Sea ; westbound vessels likewise land several goods at Port Said for the same purpose. Aden is another such *entrepôt* for goods destined to reach East Africa. At Colombo, another coaling-station and *entrepôt*, the route branches out into two directions, one of the lines going round the south of Australia, the other to Singapore, where it again branches

Suez, the meeting-place of East and West, of North and South.

Nature of trade.

Chief ports.

out into two, one for passing round the north of Australia, the other to China and Japan. Several important branch lines proceed from Singapore to Indo-China, North Borneo and the Philippines.

Importance
of Suez
Canal.

Before the opening of the Suez Canal in 1869, trans-oceanic commerce between North Atlantic countries and the East had to pass around the Cape of Good Hope, or goods had to be transported by land across South-Western Asia or North-Eastern Africa (trans-continental trade). With the opening of the Suez Canal and the development of modern coal and oil-consuming vessels trade has flourished, the time required for the voyage has been greatly minimized.¹ The Canal has, for instance, reduced the journey from London to Bombay by 4563 miles, London to Melbourne by 1000 miles and London to Yokohama by 3000 miles. This short cut to Far East resulted in the reduction of prices of many commodities and a great increase in trade. The Canal has benefited the European and Far Eastern countries more than the countries of W. America.

Old route
between
East and
West.

Connecting
W. Europe
with Africa,
Australia
and New
Zealand.

3. **The South African or Cape Route.**—Until the opening of the Suez Canal this was the only trans-oceanic route between the North Atlantic countries and the East. It was opened by Vasco da Gama in 1498 when he reached India by way of the Cape of Good Hope. It connects Western Europe not only with the western and southern parts of Africa, but also with Australia and New Zealand. Nearly half the total export of Australia to Britain is transported by way of the Cape. The principal ports in South Africa on this route are Capetown, Port Elizabeth, East London and Durban; those of Australia are Sydney, Melbourne, Adelaide and Freemantle. Durban is the most im-

¹ The construction of the Suez Canal was undertaken by Ferdinand de Lesseps, a Frenchman, in 1859 and was completed by him in 1869. The Canal was declared open in November of that year. Its length (from Port to Suez) is 100 miles, breadth between banks now varies from 400 feet to 460 feet and its depth now is between 36 and 39 feet; the present bottom width is between 148 and 195 feet. Average duration of transit through it is some 16 hours. It is at sea level throughout. The management of the canal is in the hands of a company in which the British Government has a considerable number of shares.

portant coaling-station, and Capetown the chief centre of Chief ports. South African trade. General exports of S. Africa are foodstuffs like maize, fruits and sugar, raw materials like wood and diamonds, and manufactures like gold bullion ; general imports, foodstuffs like wheat, raw materials like wood, mineral oils, chemicals and drugs, and manufactures like piece-goods of silk, wool and cotton, jute and cotton bags and machinery. General exports of Australia are raw materials like wool, hides and skins, and lead, foods like wheat, butter, meat, sugar and fruits ; general imports, raw materials like silk and cotton goods yarn and cordage, bags and sacks, chemicals and machinery. The bulk of the trade over this route is carried by freight steamers and sailing-vessels. Mail and passenger steamers between N. W. Europe and Australia, however, take the Suez Canal route. But since the distance saved by the Suez Canal is not much—only 1,000 miles on the average—and in order to avoid the high canal tolls, freight steamers generally take the Cape Route. Sailing-vessels also avoid the Suez Canal on account of the adverse winds over the Red Sea.

Nature of
trade.

Why Cape-
Route still
used.

4. **The Panama Canal Route.**—The Panama Canal was opened in August 1914. It connects the Pacific Ocean with the Atlantic, and has naturally brought about many far-reaching changes in ocean routes: the distance by sea between the eastern (Atlantic) and western (Pacific) coasts of North America has now been reduced by about 7,000 miles,—New York on the Atlantic seaboard is, for instance, 7,873 miles nearer by sea to San Francisco on the Pacific coast than formerly. Prior to the opening of the Panama Canal there was no sea-borne trade between these two coasts of N. America. It has also reduced the distance between the Atlantic coast of N. America and the Pacific coast of S. America by nearly 4,000 miles ; thus Valparaiso in Chile (S. America) is roughly 8,500 miles from New York by the Strait of Magellan or Cape Horn, whereas by the Panama Route it is only about 4,600 miles. The Panama Canal has brought Australia and New Zealand closer to the United States ; Sydney in Australia is nearly 3,500 miles from New York by the Suez Route, but by

Importance-
of Panama
Canal.

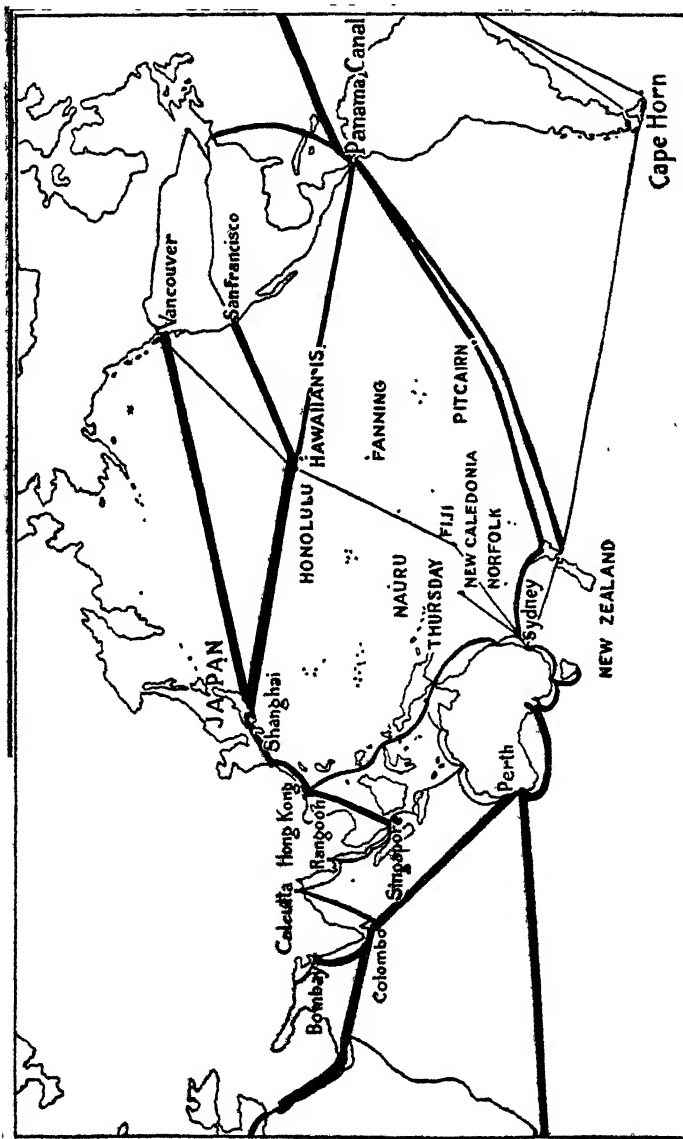
Panama
essentially
American
Canal.

Nature
of trade.

Panama
vs.
Suez.

the Panama Route it is about 9,700 miles ; the distance between New York and Wellington (New Zealand) by the Strait of Magellan is considerably over 11,000 miles, whereas by the Panama Route the distance does not exceed 8,500 miles. Japan has also been brought closer to the U. S. A. by the Panama Canal ; the port of Yokohama (Japan) is above 13,000 miles from New York by the Suez Canal, whereas it is considerably less than 10,000 miles from New York by the Panama Canal. The western seaboard of both the Americas has also been brought nearer to Europe by more than 5,000 miles on the average. Yet the Panama Canal is essentially an American highway. It has, doubtless, opened up a new route to Australia and New Zealand from Europe, but this new route has effected practically no reduction of distance ; the distance between Sydney (Australia) and Liverpool (Gr. Britain) is some 12,400 miles by the Panama Route and about 12,200 miles by the Suez Route ; that between Liverpool and Wellington (New Zealand) is over 11,000 miles by the Panama Canal and about 12,500 *via* Suez. Europe has not, therefore, been able to derive much advantage from the Panama Canal ; most of her shipping take the Suez Canal Route for trade with Asia, Africa and Australia. Until 1923-24 the traffic through the Panama Canal remained much smaller than that through the Suez Canal ; but the scale has now apparently turned in favour of the former. This has, however, been attributed mainly to the growth of carriage of oil from California to the eastern (Atlantic) side of America. Of the commodities passing through the Panama Canal, lumber from Puget Sound is said to occupy the next place ; other important commodities are wheat, China tea, Chilean nitrate and Australian meat.¹ It is extremely significant that the total tonnage of cargo carried from the Pacific to the Atlantic exceeds that moving in the reverse direction by more than 10 million tons. Although the traffic through the Panama Canal now exceeds that through the Suez Canal, the former does not yet seem to have such basic advantages as the latter. The regions

¹ Chisholm's *Handbook*, p. 697.



Ocean Trade Routes (II)

along the Panama Canal Route are, unlike those along the Suez Canal Route, neither densely populated nor noted for productivity ; the Pacific Ocean, moreover, may well be described as a vast water-desert. Important ports of call along the route are Colon, San Diego, Vancouver, Prince Rupert, Callao and Valparaiso in the Americas, and Nelson, Christ-church, Auckland and Dunedin in New Zealand. Newport News, Bilbao and Honolulu are important coaling-stations on the line. The Panama Route has gradually joined the various Atlantic Routes on the one hand and Pacific Routes on the other.¹

Important
ports.

Develop-
ment of
Pacific
routes.

Pacific
Trunk
Lines.

Chief
Ports.

5. The Pacific Routes.—The Pacific Ocean is steadily becoming more and more important as a commercial highway. This development is due mainly to American endeavour: the opening of the Japanese ports to foreign trade, the gold rush to California in the middle of the last century, the possession by the United States of Alaska, the Hawaiian Islands and the Philippines and the construction of the Panama Canal are said to be the chief factors responsible for the development of the Pacific trade routes. The main line connects the western seaboard of the United States with Eastern Asia, particularly with Japan and China. Another important line has established communication between the Philippines and the U. S. A. The trunk line that goes to Japan starts from the Puget Sound region and California and swerving northward reaches Yokohama by way of the Aleutian Islands ; the other trunk line swerves southward to the Hawaiian Islands and then proceeds westward to Eastern Asia. There are direct routes to the Philippines as well. Important ports along these routes are Seattle, San Francisco, Los Angeles, Vancouver, Manila, Yokohama and Shanghai; Honolulu is a very important coaling-station for vessels plying along the Hawaiian Islands. There are a number of ocean lanes connecting Australia and New Zealand with the various American states. The opening of the grand trunk line to

¹ The length of the Panama Canal is 50 miles ; the minimum depth of canal, 41 feet ; minimum bottom width of channel, 300 feet. The average duration of transit through it is between 7 and 8 hours.

Japan has been followed by the remarkable development of trade between that country and the U. S. A. The United States is now Japan's chief customer as well as her chief supplier. Equally remarkable has been the development of trade between the U. S. A. and the Philippines ; since the latter was taken possession of by the U. S. A. (1898), the overseas trade has multiplied thirty-five times.¹ But the nature of the trade passing along the Pacific Routes is, on the whole, extremely unbalanced: the total tonnage of goods bound for the Far East (westbound) is nearly four times as large as that bound for the Far West (eastbound to America). This has been attributed to the fact that the U. S. A., generally exports bulky commodities and imports goods of lesser bulk but of high value. Other important exports from the Far East are tea, rice, hemp, etc., and those from the Far West are wool, metal goods and machinery. This 'unbalanced trade' of the United States has its parallel in her trade with Western Europe in normal times.

Development of trade between U.S.A. & Japan.

between U.S.A. & Philippines.

Nature of Trade.

6. **South American Routes.**—These routes have some similarity with the South African or Cape Route. Prior to the opening of the Panama Canal, oceanic commerce between the eastern and the western seaboard of America had to pass around Cape Horn or the Strait of Magellan. This traffic has now dwindled in importance. Yet sailing-vessels still continue to ply around the Horn between the Atlantic and Pacific ports of America, because it is difficult for them to use the Panama Canal owing to the calms of the Panama Bay.² These South American routes connect West Indies, Brazil and the Argentine Republic. Chief ports along these lines are Kingston, Havana, Vera Cruz, Tampico, La Guaira, Georgetown, New Amsterdam, Paramaribo, Pernambuco, Bahia, Rio de Janeiro, Santos, Montevideo, Buenos Aires, Bahia Blanca and Rosario. Of all the South American routes that of the east coast is most important for commerce ; for along that line lie the coffee-

An old route.

Chief Ports.

¹ Case & Bergsmark, *College Geography*, p. 652

² The Strait of Magellan is extremely difficult to navigate ; sailors therefore prefer to take even the more stormy passage round Cape Horn.

Nature of Trade. exporting ports of south-eastern Brazil and the equally important ports of the River Plate region whence grain, sugar, meat, wool, hide and rubber are exported to the U. S. A. and Europe.

Origin. **7. Aerial Transport.**—Aerial transport is a twentieth century development, although experiments with balloons go at least as far back as 1782 when Stephen and Joseph Montgolfier, two French brothers, conceived the idea of employing 'heated air' to lift bodies. Subsequently hydrogen and other gases were used. With the invention of the internal-combustion engine came the first aeroplane—a machine heavier than air. This petrol engine is now used on airships or dirigibles which are made lighter than air by the use of hydrogen or other gas. It was only in 1910 that the first aeroplane crossed the English Channel. The Four Years' War of 1914-18 was responsible, more than any other event, for the rapid development of aerial navigation. During and after the world war II there has been a great development in commercial aviation and bulky commodities are being carried by planes now. Airways have brought widely separated countries nearer and places thousands of miles apart are reached within a few hours.

Different types of aerial machines.

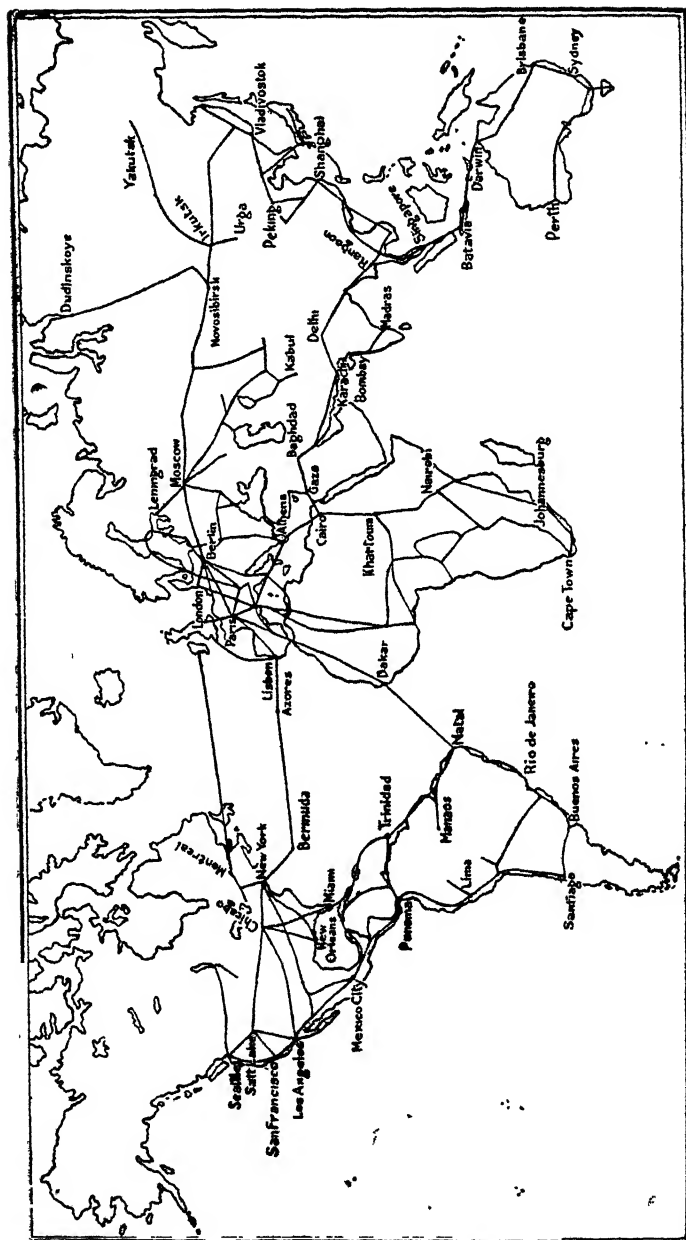
Aerial transportation vs. Railway transportation. Aerial transportation is now employed chiefly for the rapid transfer of mails, passengers and precious articles. It is advantageous in long journeys only, particularly in trans-continental flights. In short journeys railways are still supreme. At present regular air services have linked up most of the important cities of the world. The British airways between Europe on the one hand and Asia and Australia on the other generally start from Croydon (London), and passing through Marseilles, Athens, Alexandria, Cairo, Gaza, Baghdad, Bahrein, Karachi, Jodhpur, Delhi, Allahabad, Calcutta, Rangoon, Bangkok, Penang, Singapore, Batavia, Darwin, Brisbane, Sydney etc., reach Melbourne in Australia. The French and the Dutch also maintain air services along this route as they, too, have vested interests in the Far East and the South. There are air services between England and Africa as well ; the British airways start from Southampton and goes to Khar-

Chief airways.

Between Europe and Asia and Australia.

toom *via* Alexandria after crossing the Mediterranean Sea; Europe-
 at Khartoom the line branches out in two directions—one Africa.
 terminating at Capetown in the south and the other at
 Lagos in the west. The French and the Italians also have
 regular airways from Europe to Africa—to their respective Europe-
 possessions of French Equatorial Africa *via* Bathurst and America.
 of Madagascar across the Sahara and the Congo, and to
 Addis Ababa *via* Tripoli and Cairo. Airways between
 Europe and America have been developed by the French
 and the Germans. The African airport of Bathurst usually
 forms the point of departure and the Brazilian port of
 Pernambuco the terminus; thence a line radiates to
 Santiago in Chile and another to the various airports of
 the U. S. A. This is a trans-Atlantic air route. Airways America-
 across the Pacific Ocean connecting America and Asia are Asia.
 maintained by the U. S. A. The point of departure usually
 is San Francisco whence the trunk line goes to Canton *via*
 Honolulu and Manila. The continents of Europe and
 America (particularly the U. S. A.) are well served by air
 services. Regular commercial air services are established
 all over Europe. Germany was till lately the leading air-
 transport power in the world. In 1928, however, the Position of
 U. S. A. first surpassed Germany in the development of different
 airways. Important airports of the U. S. A. are New York, countries
 Washington and Boston on the east and San Francisco, in air
 Los Angeles and Seattle on the west. transport.

Commercial and Industrial Towns.—Any random Importance
 spot is not convenient for the exchange of commodities on of relief.
 a commercial scale, while certain other places are eminently
 suitable for such transaction. A study of the various
 towns, big and small, within a given region will, on the
 other hand, show that these are all, more or less, centres Towns as
 of exchange for the districts around. The inevitable con- centres of
 clusion from these data is that a town is always a centre exchange.
 of exchange, even if all the spots favoured by topography
 for commercial and industrial development are not towns. Conditions
 It is necessary, therefore, to study the factors that help favouring
 the growth of towns and cities as well as commercial and growth of
 industrial areas. These are, however, of various kinds, and towns.



The Airways of the World.

it is customary to enumerate them in some such way as follows:—

(a) Many of the world's most famous cities owe their origin and development mainly to religion. Familiar instances are Mecca, Jerusalem, Banaras, Lhasa etc.

(b) Several other towns have grown up to be what they are chiefly as educational centres. Obvious instances are Oxford and Cambridge.

(c) Health and pleasure resorts also sometimes grow up to be more or less important towns. Vichy, Bath, Saratoga, Darjeeling etc., are some of the instances.

(d) Natural wealth, especially minerals, are responsible for the growth of many important towns. Scores of instances may be cited at will. Unfavourable climate is no hindrance to the growth of towns located in the vicinity of mineral deposits as the towns of Northern Chile and Western Australia show.

(e) Nearness to the site of water-power is another factor helping the growth of towns. The 'fall-line towns' of the U. S. A., like Buffalo, Holyoke, Minneapolis, St. Paul etc. are well-known instances.

(f) Towns often grow up at the meeting of hill and plain, at the confluence of navigable rivers, at the highest point to which a river can be navigated, at points where a river suddenly changes its course, and at spots where surface relief lead to the convergence of various railways or roads. Milan at the foot of the Alps is a place where commodities from the mountains can be exchanged for those of the plains. Allahabad, Lyons, Manaus, St. Louis, Frankfort-on-Main, Pittsburg etc. have grown up at the junction of rivers. Chicago, Toronto, Winnipeg etc. are important railway junctions.

(g) Towns often spring up where physical and other conditions necessitate a change in the mode of transport or where it is most convenient to deposit bulk goods for their eventual distribution. Sea-ports are the most outstanding examples of this class of towns.

(h) Many towns owe their origin and growth to strategic advantages of location. Copenhagen, Istanbul, Gibraltar etc. are notable examples.

(i) Historical and political movements are also responsible for the growth of many towns. Paris, Washington, Delhi, Berlin etc. may be cited as familiar instances.

Importance
of location
in deter-
mining
the origin
and
develop-
ment of
towns.

It is clear from the foregoing analysis that of all the factors responsible for the growth and development of towns, location is by far the most important. According to Semple it is the supreme geographical fact in history ; "area itself, important as it is, must yield to location."¹ A place of pilgrimage will not develop into a large town or centre of business if located unfavourably for the exchange of commodities. Badrinath in the mountain fastnesses of the Himalayas has not developed into a town at all. The importance of Banaras, on the contrary, lies in its favourable position in the Gangetic Valley. Mecca was an important city even in pre-Muslim days, and so was Jerusalem in pre-Christian times ; both the cities are remarkably situated. As for educational centres the truth is that towns rarely grow up because of universities, but universities are established where towns have already sprung up. The situation of the two most famous universities of England—that of Oxford and Cambridge—in the east midlands is important ; Oxford, moreover, is now a centre of England's motor industry. Other university towns of England—London, Liverpool, Leeds, Durham, Sheffield, Manchester and Birmingham—are important business centres as well.

Ports.

Another thing to be noted in this connection is the fact that most of the great cities of the world are sea-ports, *i.e.*, situated on or near the margin of the sea. A port is a gate-way between the land and the sea, and thus performs the dual function of loading and unloading cargo.

Harbours.

The importance of a port depends primarily on two factors—(1) *the facilities it can afford to shipping*, and

¹ E. C Semple, "Geographical Location as a Factor in History," *Geographical Society Bulletin*, Vol. 40, pp. 65-66.

(2) *the productiveness and accessibility of the region it serves.* The entire region served by a port is called its **hinterland**, and where ships can have a place of shelter is known as a **harbour**. A port must, therefore, have a harbour in front and a hinterland behind. Harbours may be either *natural* or *artificial*: a natural harbour is essentially an indentation in the coastline spacious and deep enough to admit ocean-going vessels and sufficiently protected by topographical features from destructive winds and waves. It provides a calm anchorage for shipping. Liverpool and Cork in Britain and San Francisco in the U. S. A. are said to possess excellent natural harbours. Where, however, topographical features are unfavourable artificial harbours are constructed for providing safe accommodation to shipping. In order to combat the recurring shallowness caused by the deposit of materials due to streams, waves, current and tides, the work of dredging is repeated at frequent intervals. Large sums of money are thus regularly spent for deepening many such harbours. Breakwaters are also used for combating the destructive work of waves within the harbour area so that shipping may lie in safe anchorage; this is especially important where the harbour space is limited. The essentials of a good harbour are (a) an approach channel of ample dimensions, (b) adequate protection against storms, (c) sufficient space for docks and wharves, (d) ample area, and (e) ample depth. For the accommodation of the largest vessels a harbour must have more than 40 feet of water. London, Liverpool, Southampton, Le Havre, Hamburg, Antwerp, New York, Boston, San Francisco, Rio de Janeiro and Sydney are the outstanding examples of deep-water harbours of the world. Another factor determining the value of harbours is the tidal range: the depth of water at high tide enables many ships to enter and clear a port at that time; where the water level does not permit this type of activity lighters are used for loading and unloading cargo. Another point of importance is the area of a harbour. New York, San Francisco, Rio de Janeiro and Sydney are among the extensive harbours of the world. Climate is another factor

determining the value of not only ports and harbours but also of entire coastline. Not a single harbour along the entire northern coast of Russia remains ice-free for the whole of winter. Even Vladivostok situated on the south-eastern coast of Siberia does not remain free from ice all the year round. At present, however, it is kept open by the use of ice-breakers. The Baltic ports also suffer from the same fate during winter. Many of the northern ports of Germany would be closed for a part of winter were it not for ice-breakers. Canada carries on her commercial activity during winter through Halifax and Portland, because the St. Lawrence remains ice-bound for several months in winter.

Hinter-
lands.

Distributory
& contri-
butory
Hinter-
lands.

Over-
lapping
of Hinter-
lands.

But of more fundamental importance to a port is its hinterland. A hinterland may be defined as "*the land which lies behind a seaport or a seaboard, and supplies the bulk of the exports, and in which are distributed the bulk of the imports of that seaport or seaboard, either generally or in relation to certain uses.*"¹ Hinterlands are sometimes classified as *distributory* and *contributory*: a distributory hinterland is concerned mainly with the importation of goods and raw materials in order to supply its inhabitants with the necessities and luxuries of life and to keep its manufacturing industries supplied with the necessary raw materials. A contributory hinterland is concerned chiefly with the exportation of commodities—food, raw materials and manufactured articles as the case may be. But this is more in the nature of an academical than a real distinction; actually all hinterlands serve both purposes—in varying degrees. The hinterlands of different ports often overlap as much in relation to different seas as to the same seas. There may also be several ports serving the same hinterland. Thus the Punjab is included in the hinterland of Karachi for Arabian Sea trade, but for Bay of Bengal trade it belongs to the hinterland of Calcutta. Considerable portions of Central India likewise may be included in the hinterlands of both Bombay and Calcutta. An enormous portion of Yorkshire belongs to the hinterland

¹ Chisholm's *Handbook*, p. 104.

of Liverpool for Irish Sea and trans-Atlantic trade, but to that of Hull, Goole and Grimsby for North Sea traffic. Again, as the last illustration shows, the same hinterland is often served by different ports, or, to put it, in another way, the hinterlands of different ports overlap in relation to the same sea. The ports of Bombay, Okha, Porbandar, Navalakhi etc. may be said to serve the same hinterland, or their respective hinterlands may be said to overlap. The smaller ports of Kathiawar are now steadily rising in importance because of increasing traffic due to lower port charges. The value of a hinterland is increased by improvements in the means of internal communication, by adjustment of inland freight rates, and by improving the port itself.

Sea-ports are sometimes divided into various types according to the nature of the harbours and the means of internal communication. These may be enumerated as follows :—

(a) *Open Roadsteads* : These are small areas of water near the shores where ships can ride at anchor. Naturally, therefore, these are extremely deficient in good harbours, and ships in such places are usually obliged to load and unload their cargoes by means of lighters. Often the roadsteads are deficient in the means of internal communication also as they are rarely situated at the end of large valleys. Boulogne, Mollendo and Antofagasta are among the noted illustrations.

(b) *Bay Ports* : These are usually situated on bays that penetrate the land deeply or on projections extending far into the sea. Naturally, therefore, these ports often afford safe, commodious and deep harbours. Boston is a good illustration.

(c) *Estuarine Ports* (often miscalled 'river ports') : These are situated at the head of estuaries or tidal mouths of large rivers. Obviously such ports have the advantage of easy inland communication, but they often suffer from the silting up of river beds and the want of space for

anchorage, docks and wharves. Regular dredging is required to keep the ports open. Familiar instances are Calcutta and Chittagong ; London, situated at the head of the Thames estuary 55 miles from the sea, is another example.

(d) *Bay Ports at river mouths*, however, are ideal for commerce. They combine all the advantages of ordinary Bay Ports with those of the Estuarine Ports. New York at the mouth of the Hudson may be cited as a good illustration.

River Ports.

Many important commercial towns, we have already noted, grow up on river banks. These are *river ports* properly so called. Some of these are located at the highest point to which rivers can be navigated, some others where further navigation is difficult owing to the existence of a rapid or a fall, still others at the turning points of rivers. The value as well as the importance of these ports depends on two primary factors—(a) the productivity of the region served by them and (b) the navigability of the rivers. Narayanganj, Goalundo, Chandpur and Jhalakati are some of the important river ports of East Pakistan. Narayanganj is a collecting and distributing centre which act as a clearing-house for the jute and rice of East Pakistan ; Goalundo is noted for its fish trade ; Chandpur acts as a clearing-house for the products of the fertile Surma Valley of Assam ; Jhalakati, with the adjoining port of Nalchiti, is a centre of the betel-nut trade of East Pakistan. Gauhati and Dibrugarh are important river ports of Assam. All these ports are situated on rivers navigable by steamers. Much of the jute and paddy brought to the mill towns on the Hooghly such as Naihati, Bhatpara, Titagarh and Serampore are transported by the waterways of the Delta.

Entrepôts.

Another word frequently met with in books on commerce is '*entrepôt*. An *entrepôt* is a port where commodities are imported for the purpose of re-exporting them to regions which cannot import them direct from their sources. Gibraltar, Marseilles, Algiers, Port Said, Aden,

Colombo, Singapore, Hong Kong and Shanghai are among the great *entrepôts* of the world.

Important Ports of the World

Asia.—There are only three major sea-ports in India ^{India.}
 —Calcutta, Bombay, Madras. **Calcutta** stands on the Hooghly, some 80 miles from the sea. The passage of the river is dangerous, especially to small crafts, owing to sand-banks and changes in the river bed. During the period of early influx of Europeans into India the river was navigable by ocean-going vessels for a considerable distance upstream, and many ports then flourished farther inland. These have now declined because of silting, which is a standing menace to Calcutta as well. The passage of the river up to Calcutta is only kept navigable at considerable cost. Moreover, the tidal wave which rushes up the river at high tide also helps to keep the waterway clear. Its wharves are, therefore, accessible to all but the largest ocean liners of today. For facilities of inland communication, however, Calcutta is admirably situated: inland waterways connect her direct with the east and north of the Delta. The *Calcutta and Eastern Canal* is one of the arterial channels of such communication. It enables the raw jute of Eastern Bengal to reach the mills of Calcutta and the adjoining parts at a very cheap rate. The city's proximity to the Raniganj coal-fields has also contributed much to the development of her manufactures. Of the important delta channels the Hooghly is the westernmost, and so railways from the west are not required to cross any large body of water; this has made Howrah on the opposite (west) bank of the Hooghly, the terminus of railways from Delhi, Bombay and Madras to the great advantage of Calcutta, which is connected with Howrah by a bridge. Railways connecting Calcutta with North and Eastern Bengal and Assam radiate from Sealdah on the eastern boundary of the city. The hinterland of Calcutta is the largest in India; it includes Bengal, Bihar, the U. P., Orissa and Assam, and also extends to the Punjab beyond Delhi and to Central India in the neighbourhood of Nagpur.

Character-
istics of
port of
Calcutta.

Inland
communi-
cation.

Hinter-
land of
Calcutta.

Exports & Imports.

The bulk of Calcutta's exports—about 58 per cent—consists of *jute*, both raw and manufactured ; other important exports in the order of importance are *tea*, *lac*, *oilseeds* and *cotton goods*. The principal items of import are *cotton goods*, *metals*, *machinery*, *government stores*, *railway stock*, *hardware*, and *oil*. Calcutta is often described as the 'Commercial Capital' of India. It is a fine estuarine port.

Characteristics of port of Bombay.

Bombay is the second city of India, and according to many, the first 'if Howrah be excluded from the Calcutta agglomeration.' It owes its importance to several geographical factors : it has, first, a magnificent natural harbour ; second, it is in command of two gateways through the Western Ghats ; third, its location makes it the natural gateway to India from Europe ; fourth, its hinterland includes the rich cotton lands of the Bombay and Deccan ; fifth, its climate like that of the west side of the Pennine Upland of England being highly suitable for cotton manufactures, has made it a great centre of cotton spinning and weaving ; sixth, the water-power resources in the Western Ghats, near by, have added impetus to its cotton industry. But like New York, again, Bombay is now experiencing difficulty of expansion on its island site ; the bay on the west of the city and north of the lighthouse known as the 'Back Bay' is now being partially reclaimed for more land. The city is now connected by railways with the larger island of Salsette behind it and also with the mainland. Thus inland communication has been established with the north, east and south so as to connect the city with Delhi, Calcutta and Madras. The hinterland of Bombay extends upto Delhi on the north, Jubbulpore and Nagpur on the east and almost reaches the city of Hyderabad on the south-east. The principal items of export are *raw cotton* (about 48 per cent), *cotton goods* (about 20 per cent), *cotton seed*, *linseed*, *groundnuts* and *sesamum*, *wool*, and *hides*, *skin* and *leather*. The principal items of import show a surprising sameness with those of Calcutta, except for the *treasure import* (gold and silver) which is virtually restricted to Bombay. Bombay is the great rival of Calcutta. It is a fine bay port.

Inland Communication.**Hinterland of Bombay.****Exports & Imports.**

Madras is the third largest city in India, but the last of the four great ports. It was one of the many open roadsteads on the south-east coast of India. At present it is provided with a modern artificial harbour; constant dredging operations are required to keep it navigable. The city is well served by railways, and the *Buckingham Navigation Canal* provides a passage for small craft along the coast. The hinterland of Madras is neither so rich nor so extensive as any of the hinterlands served by Calcutta, Bombay and Karachi. The bulk of export—about 45 per cent of the total—consists of *leather*; other items are *skins, raw cotton, cotton goods* and *groundnuts*. Imports are virtually the same as in the case of Calcutta.

Characteristics of Madras port.

Communication.

Hinterland.

Export & Import.

Karachi is the biggest port of West Pakistan. It is situated on a small bay to the west of the mouths of the Indus. It has a natural rock-girt harbour, which has been much improved by modern engineering. The harbour is now protected by a breakwater. In some respects it is admirably situated, being readily accessible from the Makran Coast, from Basra and the Persian Gulf, from Aden and the Red Sea and from Bombay. Karachi is connected by railways with the Punjab and the N. W. F. P. *via* Multan, Lahore and Peshawar, with Baluchistan *via* Quetta and the Bolan Pass. Its hinterland extends to Quetta and beyond as well as to Peshawar in the north while including the whole of Sind and the Makran Coast. The Makran Coast serves as a land-caravan route as well. The principal items of exports are *raw cotton* (more than 33 per cent) and *wheat* (about 25 per cent); other important items are *barley, oilseeds* (rape), *wool, gram* and *leather*. Imports are machinery & mill work, metals & ores, chemicals & drugs, paper, petroleum, coal etc. Karachi may be described as a bay port at the mouth of a river; but the Sind Delta does not offer facilities for water carriage. Karachi has now become a leading international airport.

Characteristics of Karachi port.

Communication.

Hinterland.

Export & Import.

Colombo is the chief seaport of Ceylon on the west coast of the island, and enjoys a virtual monopoly of the

Ceylon.

Characteristics of Colombo port.	foreign trade. It is a great <i>entrepôt</i> as well. Its importance is due to the splendid geographical position it holds on the ocean highway from Europe to Australia and the Far East. It has a magnificent artificial harbour, and is a
Communication.	most important port of call. It is connected by railways with all the important towns of Ceylon. Principal items of export are <i>tea</i> (50 per cent), <i>rubber</i> (25 per cent) and <i>cocoanut products</i> (18 per cent). Leading imports are foodstuffs like <i>rice</i> (29 per cent), <i>sugar</i> , <i>fish</i> , <i>grain</i> and <i>curry</i> (together 11 per cent), raw materials like <i>mineral oil</i> , <i>coal</i> , <i>fertilisers</i> and <i>rubber</i> (together 20 per cent), and manufactures like <i>cotton goods</i> (8 per cent), <i>iron</i> and <i>steel</i> , <i>machinery</i> and <i>motor cars</i> (together 6 per cent).
Export & Import.	

Characteristics, communication and export & import of Rangoon port.	Rangoon is by far the most important port of Burma, handling, as it does about 86 per cent of the foreign trade of that country. It is situated some 20 miles from the sea on the Rangoon river to the east of the Irrawaddy Delta, and is connected by railways with Prome and Mandalay. It commands the land and water highways of both the Irrawaddy and Sittang Valleys. It is accessible to the largest ocean-going vessels plying in Indo-Chinese waters. By far the most important item of export is <i>rice</i> (62 per cent) ; next come <i>petroleum</i> and <i>wax</i> (together 14 per cent) ; other important exports are <i>teak</i> and <i>cotton</i> (together 8 per cent). Principal imports are <i>cotton goods</i> , <i>machinery</i> and <i>hardware</i> , <i>coal</i> , <i>silk</i> and <i>sugar</i> .
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Characteristics, communication, export & import of Bangkok port.	Bangkok is the great port of Siam or Thailand. It is situated on the river Menam, and is said to be visited annually by nearly 1,000 vessels with an aggregate tonnage of over 1,000,000 tons. But there is a bar at the mouth of the Menam, which does not permit large vessels to enter port. Bangkok is connected by railways with Penang and Singapore. By far the most important item of export is <i>rice</i> —about 87 per cent of the total ; next comes <i>teak</i> —only 4 per cent ; another notable item of export is <i>tin</i> . Leading imports are <i>cotton manufactures</i> (17 per cent), <i>cigarettes</i> (5 per cent), <i>iron and steel</i> (5 per cent), <i>gunny bags</i> (5 per cent), <i>yarns</i> (4 per cent), <i>silk</i> (3 per cent), <i>machinery</i> (2 per cent), <i>sugar</i> (4 per cent), <i>wine</i> (2 per cent), <i>gold</i>
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leaf (6 per cent), *mineral oil* (4 per cent), *precious stones* (3 per cent), and *opium* (3 per cent).

Saigon, the chief port of Cochin-China (French Indo-China), stands on an outlet of the Mekong 34 miles from the sea. It is said to be annually visited by about 900 ships with an aggregate of nearly 2,000,000 tons. It has important channels of inland communication by railways and waterways. The chief exports are *rice, fish, fish-oil, pepper, cotton, copra, rubber and spices*. Chief imports are as usual *cotton goods, metal goods, silk goods, machinery, iron and steel, cotton yarn, motor cars, munitions, petroleum and sugar*. Rice export covers more than 60 per cent of the total export business.

Characteristics, communication, export & import of Saigon port.

Singapore is situated on an island of that name at the southern end of the Malay peninsula. It owes its importance mainly to its splendid geographical position at the junction of the world's great trade routes between the east and the west ; it is the gateway of commerce between the Indian and Pacific Oceans. It has a magnificent harbour, and large ship-building and ship-repairing yards have also been established here. It is the great *entrepôt* and coaling-station of the Far East. It is connected by railways with Bangkok and Penang. Singapore is also a naval base for the British Admiralty. Large tin-smelting works have been established here. The trade of Singapore being that of an *entrepôt*, it imports and exports a large number of products, which, however, are not shown in official returns separately for Singapore but for the whole of British Malaya.

Characteristics, and communication of the port of Singapore.

Manila, the chief port of the Philippines, is on the Pacific trunk line between America and the Far East. It has an excellent artificial harbour, and is connected by railways with San Fernando on the north and Batangas on the south. Leading exports are *sugar, Manila hemp, cocoanut oil, copra and tobacco* ; leading imports, *cotton goods, silk goods, iron and steel, paper, vehicles, chemicals, electrical machinery, rice, wheat, dairy and meat products, fish, vegetables, oil, coal and tobacco*.

Characteristics, communication, export & import of Manila port.

China.

Character-
istics,
communi-
cations,
export &
import of
port of
Hong
Kong.

Hong Kong is situated near the mouth of the Canton river. It is an island, and is under British occupation. It is separated from the mainland by a strait only about a mile wide. It has a deep and commodious anchorage at Victoria Bay on the northern side of the island ; moreover, the strait between the mainland and the island is an excellent harbour. It has also some of the largest ship-building and ship-repairing yards in the British Empire outside Great Britain. The Canton river is navigable for more than 600 miles from its mouth, and the great city of Canton, which resembles Calcutta in many respects, only about 90 miles north of Hong Kong, is very advantageously situated for the sea-borne trade of this island port. Hong Kong is said to be visited annually by 30,000 vessels. It is the great *entrepôt* for Southern China. The principal items of export from Hong Kong are *foodstuffs* (23 per cent), *treasure* (9 per cent), *piece goods* (9 per cent), *oils and fats* (7 per cent), *metals* (5 per cent), and *tobacco* (3 per cent). Chief imports are *foodstuffs* (41 per cent), *piece goods* (12 per cent), *oils and fats* (6 per cent), *metals* (1 per cent), *treasure* (5 per cent), *Chinese medicines* (4 per cent). Hong Kong is a free port.

Character-
istics of
port of
Shanghai.

Shanghai is the largest of the many ports of China. It is the great port of the Yangtze Kiang and the gateway of the most extensive and productive natural region of China. It is, however, not situated on the Yangtze Kiang, but on a tidal creek 54 miles from the sea ; it is on the Wusung or Hwangpu river, 14 miles from the confluence of the Yangtze Kiang and the Wusung. But a bar at the mouth of the Wusung long prevented the entrance of the largest vessels ; the river has now been canalized and the largest vessels plying in Chinese waters are now admitted. Excellent shipbuilding yards have now been established at the port. The Yangtze Kiang itself is an admirable waterway for more than 1,000 miles from its mouth, and several of its tributaries are also good inland waterways. Shanghai is also connected by railways with Tientsin and Peiping on the north and with Hangchow immediately south. Owing to the richness of its hinterland

and also because of the dearth of good seaports in the region lying north of the Yangtze Kiang, Shanghai has grown into one of the great *entrepôts* of the world: it serves all the other Yangtze ports such as Nanking, Hankow, Chinkiang, Ichang, Kiukiang, Chungking, etc., as well as the whole of Northern China. Leading exports are *raw silk, beans, bean cake, vegetable oils, raw cotton, tea, coal, silk goods, metals and ores, eggs, groundnuts, etc.*; leading imports, *cotton goods, machinery, iron and steel, cigars, woollens, kerosene, raw cotton, tobacco, coal, indigo, rice, sugar, flour and fish.*

Communi-
cation &
Hinterland.

Export &
Import.

Canton, situated on the west bank of the Canton river, is the leading port of Southern China. Its situation in the Si Kiang delta region is analogous to that of Calcutta; but as to facilities for inland water carriage it is said to resemble Venice. Like Calcutta, however, Canton is situated 'on one of the most productive of tropical deltas'. Besides natural waterways and canals to link it up with various towns, Canton is connected by rail with Tientsin and Peiping on the north; another railway line has established connection between Hong Kong and Canton, but running of trains has been abandoned for some years. Regular steamer services between Hong Kong and Canton are, however, being maintained, and Canton is visited regularly by ships from foreign countries as well. The exports and imports are, on the whole, similar to those of Shanghai.

Character-
istics,
communi-
cation,
export &
import of
Canton
port.

Most of the Japanese towns are seaports. But the most important seaport of Japan is **Yokohama**, the outport of Tokyo which is not accessible to large vessels. Yokohama has a safe and commodious harbour accessible to the largest liners plying the Pacific. It deals with miscellaneous articles of trade. **Kobe**, provided with an excellent harbour, serves mainly as the outport of Osaka, the leading centre of Japan's cotton-spinning industry. Osaka itself is accessible, like Tokyo, for small vessels. **Nagasaki** has an excellent harbour and a great ship-building yard. The leading exports of Japan are *raw silk* (38 per cent), *cotton goods* (23 per cent), *silk goods* (7 per cent), *coal* (2 per cent), and *pottery* (2 per cent); leading imports, *raw cotton*.

Port of
Yokohama.

Port of
Kobe.

Port of
Nagasaki.

(27 per cent), *iron* (7 per cent), *machinery* (5 per cent), *wood* (4 per cent), *wool* (4 per cent), *woollen goods* (4 per cent), *sugar* (3 per cent), *paper* (2 per cent), *rice* (2 per cent), *wheat* (2 per cent), *miscellaneous metals* (2 per cent), and *beans and other foodstuffs* (6 per cent).

Manchuria
and
Asiatic
Russia.

Ports of
Dairen,
Port
Arthur &
Vladivostok.

Harbin
and
Moukden.

Turkey.

Character-
istics,
communi-
cation,
hinterland,
etc. of
port of
Izmir.

Port Arthur and Dairen on the Liau-tung peninsula in Manchuria and **Vladivostok** on the east coast of Asiatic Russia are notable ports for their respective locations. All of them are well served by railways for inland communication. Of these Dairen is probably the busiest port, acting, as it does, the part of the great outlet for Manchurian products. The leading exports of Manchuria are *bean cakes*, *beans*, *bean oil* (together 50 per cent), *wheat* (12 per cent) and *other cereals* (8 per cent), *coal* (4 per cent), *silk yarn*, *Kaoliang* and *lumber*. Vladivostok on the Sea of Japan is Russia's most important harbour and naval station in the Far East. It is connected by rail with Moscow and Leningrad. The trade, however, is small, and the port would remain icebound for several months of the year were it not for the of ice-breakers. **Harbin** is an important inland town of Manchuria, situated at the spot where the railways diverge for Vladivostok, Port Arthur and Dairen. Its neighbourhoods are rich in coal measures and forests. **Moukden** is the great inland trade centre of Manchuria; there is a large production of coal from its neighbourhood.

Izmir, formerly **Smyrna**,—apart from Istanbul (Constantinople)—is the leading port of Turkey. It is situated on the Gulf of Smyrna, Aegean Sea, and serves as the chief outlet of the west coast. It possesses an excellent natural harbour commodious enough for the largest ships. The hinterland comprises the valleys of the Caicus, Hermus, Cayster, Meander and Indos, which together form the richest and most important region of Turkey. The Izmir region is rich also in mineral deposits, some of which are now being worked. Though not very well served by railways, it has railway connection with many important places such as Ankara in the interior and Adana and Alexandretta on the Mediterranean coast. The principal items of exports

are *raisins, valonia, cotton, opium, figs, barley, liquorice, carpets, wool and sponges*. Chief imports are *cotton goods, woollens, metals and cereals*. **Trabzon**, formerly **Trebizond**, is the chief port on the Black Sea, serving the north-eastern region of Mediterranean agriculture. **Istanbul**, formerly **Constantinople**, belongs to European Turkey. Situated between the straits of Bosphorus and Dardanelles it holds a most strategic position. Much of the trade between Western Europe and Turkey is carried on by way of this important city.

Trebizond
the Black
Sea Port.

Istanbul
the gate-
way to
West.

Beirut is the chief port of Syria. It is connected by a road and a railway with Damascus. **Alexandretta**, the port of Aleppo, lies farther north. **Haifa** in Palestine is a notable port south of Beirut ; a railway connects it with Cairo across the isthmus of Suez. But **Jaffa** is at present the leading port of Palestine. Syria's chief exports are *cotton and cotton thread, raw wool, animals, raw silk and cocoons, fruits and nuts* ; chief imports are *textiles* (cotton wool and silk) and *cereals*. Palestine's exports are *oranges, soap, water melons, wine, almonds and skins* ; her imports are *foodstuffs* (rice, flour, sugar, etc.), *manufactured goods* (cotton fabrics, motors, etc.), and *raw materials* (kerosene, benzine, wool, etc.). The foreign trade of the whole region is extremely unbalanced : Syria's imports are more than double the exports in value, while Palestine's imports exceed her exports nearly five times in value. **Aden**, on the south coast of Arabia, possesses an admirable natural harbour and serves as a great *entrepôt* in the trade between Asia, Africa and Europe. It is a fortified coaling station as well. The opening of the Suez Canal has increased its strategic value to a great extent.

Arab Asia
and Near
East.

Ports of
Beirut,
Aleppo,
Haifa,
Aden.

Europe.—The first nine seaports of the United Kingdom, according to Stamp, are London, Liverpool, Hull, Southampton, Manchester, Glasgow, Harwich, Bristol, and Grimsby. Of these **London** and **Liverpool** are by far the most important, handling, as they do, 60 per cent of the total trade of the United Kingdom between them ; London leads in exports, Liverpool in imports. London's pre-eminence is due, among other things, to its excellent situation

United
Kingdom.

Port of London.	at the head of the Thames estuary, about 55 miles from the sea. It is accessible to the largest ocean-going vessels. The mouth of the Thames is directly opposite another important estuary—that of the Scheldt, and nearly opposite the mouth of the Rhine. This has given London a commanding position in its trade with continental Europe. It is now one of the biggest <i>entrepôts</i> of the world—in fact, the greatest import market the world has yet seen. London handles more than 50 per cent of the trade of the United Kingdom. But curiously enough it is situated in the heart of the agricultural region of England and has no coal, no iron, no water-power ; nor has it any outstanding manufacture. It is now the chief railway centre for the British Isles, and its docks have been built at great expense. The exports and imports of London are of a miscellaneous kind.
Port of Liverpool.	Liverpool is situated at the mouth of the Mersey ; the harbour is said to be commodious enough for ‘all the fleets of the world’ ; the hinterland comprises Preston, Accrington, Burnley, Bradford, Leeds, Bolton, Blackburn, Oldham, Manchester, Sheffield, Northwich, Nottingham, Leicester, Birmingham, etc.; the chief articles of commerce are <i>cotton goods, woollens, cutlery, leather, hardware, potteries, and glass and chemicals</i> . Of these cotton goods are by far the most important. The damp climate and the abundance of soft water from the Pennines are said to be ideal for cotton manufacture. The principal item of import is, of course, <i>raw cotton</i> . Liverpool is now connected with the port of
Port of Manchester.	Manchester by means of the famous <i>Liverpool-Manchester Ship Canal</i> , which has enabled shipments of cotton to reach Manchester direct. Manchester is the town most closely associated with the cotton industry of Great Britain.
Hull Port of	Hull , at the confluence of the river Hull and Humber, serves the northern midlands, and to a lesser degree the southern midlands and London as well. Like London it also handles miscellaneous goods. The hinterland of Hull, as also that of Goole and Grimsby, overlaps with that of Liverpool.
Port of Southamp- ton.	Southampton is the chief commercial port on the south coast of Britain. The harbour is commodious, and it is an important port of call for trans-Atlantic vessels. Its export

trade is of a miscellaneous nature and its import trade, though on the whole of the same nature, is characterized by the importation of large quantities of fresh and refrigerated meat and fruit. **Glasgow**, on the Clyde, first ^{Port of} rose to importance, like Liverpool, with the growth of ^{Glasgow.} American trade. It has an excellent natural harbour, improved considerably for the accommodation of modern giant liners. There are abundant coal and iron deposits in the immediate neighbourhood of Glasgow, and this has led to the growth of various industries there. Owing to the varied nature of these industries it is difficult to single out an industry as characteristic of Glasgow, except, of course, ship-building and marine engineering. The export trade of Glasgow, it is interesting to note, is 50 per cent. more in value than its import trade. **Harwich**, to ^{Ports of} the north-east of London, is engaged mostly in continental ^{Harwich,} trade, and has a relatively small export business. **Bristol**, ^{Bristol &} on the west, commands the Seven Valley and the thickly ^{Grimsby.} peopled region immediately east of it. Its export trade has, however, dwindled considerably in importance, but the import trade still continues to be large. **Grimsby**, on the eastern seaboard, is a minor port specializing in the export of coal and large iron and steel castings.

The principal seaports of France in the order of their ^{France :} importance are Marseilles, Le Havre, Rouen, Dunkerque, Bordeaux, La Rochelle, Nantes and Cherbourg. **Marseilles**, to the east of the Rhone delta, is said to be the only first-class port on the Mediterranean Sea. It commands the ^{Port of} rich and productive Rhone Valley which enjoys the Medi- ^{Marseilles.} terranean type of climate, and affords direct access by means of waterways to the plains of northern France and Belgium. It is also well served by railways. Although it shares in the trans-Atlantic trade, its main business is with the Mediterranean region and the East. It is one of the principal *entrepôts* of the world, importing, among other things, large quantities of *wine, wheat, oil-seeds, sugar, coffee, hides, silk and pepper*. **Le Havre**, at the ^{Port of} mouth of the Seine, is the principal centre of trade with ^{Le} **America**, and affords direct access to the Paris Basin by **Havre.**

Port of
Rouen.

Port of
Dunkerque.

Ports of
Bordeaux.

La Rochelle
Nantes &
Cherbourg.

Belgium:

means of waterways. The Seine estuary, however, is dangerous to small craft, and constant dredging operations are necessary to keep the port open. It also serves more or less as an *entrepôt*, and imports *cotton, tobacco, wheat, animal products and coffee*. **Rouen**, on the Seine farther inland, stands in much the same relation to Le Havre as Manchester to Liverpool. The Seine has been well canalized for enabling large vessels to approach the port of Rouen direct, and this has resulted in the diversion of much of the trade of Le Havre to that port. Besides, Rouen at times imports large amounts of coal, and thus sometimes exceeds even Marseilles in the total tonnage of commodities handled. **Dunkerque** is the only North Sea port of France. Its hinterland comprises the coalfield region of Northern France—a continuation of the Great Belgian Coalfields—and the port serves the northern manufacturing towns like Lille, Roubaix and Valenciennes. The principal import is *wool* from South America and the chief items of export are *textiles, iron, beet sugar and oils*. The harbour has been deepened for the accommodation of large vessels, and the port is well served by a splendid network of first-class waterways. **Bordeaux**, on the Garonne, is the principal centre for the export of French wines. Its outport, Pauillac, is accessible to the largest vessels, and the river has been deepened for miles inland. **La Rochelle**, with its outport of La Pallice which is accessible to large vessels, serves the middle regions of Western France. **Nantes**, on the Loire, became thoroughly useless as a seaport owing to the silting up of the Loire below it. Its outport, St. Nazaire, at the river-mouth, however, is accessible to large vessels, and the river has now been thoroughly dredged so as to enable moderately big vessels to reach Nantes. A ship canal also connects Nantes with Brest. St. Nazaire is well known for its ship-building yards. **Cherbourg**, on the English Channel, is well situated for trans-Atlantic trade.

Antwerp, on the Scheldt estuary, is the largest port of Belgium. It lies directly opposite the Thames estuary, and is much more advantageously situated than London for

inland trade. It is connected by first-class waterways with the Meuse, Seine and Rhine. It serves not only as an outlet for Belgium, but also as the chief outlet for the principal manufacturing region of Germany. The quayside is said to be 28 miles long and the dock water area 1,334 acres. **Ghent**, at the confluence of the Scheldt and Lys, has been made accessible to vessels of moderate size by the construction of a ship canal. **Ostend**, on the west coast, and **Bruges** with its outport, Zeebrugge, are of much less importance. There is a large artificial harbour at Zeebrugge, and Bruges is connected with the sea by a ship canal.

Port of
Antwerp.

Ports of
Ghent,
Ostend, &
Bruges.

Amsterdam and Rotterdam are the two chief ports of Holland. **Amsterdam**, on the Ij, near the shallow Zuider Zee, has been made accessible to the large modern vessels by means of the North Sea Canal. The port is well served by inland waterways, especially by the Merwede Canal. Amsterdam is the world's centre of diamond trade. **Rotterdam**, on the Nieuwe Maas, is the largest port of Holland. But the river is too shallow even at the mouth for large ocean steamers, and a ship canal—the 'New Water-way'—now acts as the commercial highway for the port. Constant dredging operations are required for keeping the whole network of canals open to traffic. Much of the trade coming down the Rhine Valley passes through Holland, especially Rotterdam.

Holland :

Ports of
Amsterdam
and
Rotterdam.

The largest and most important seaport of Germany is **Hamburg** with its outport, Cuxhaven. It is a North Sea port, and has risen to importance with the development of American trade. But in normal times it trades with the East as well, and buys much jute from India for its own jute mills. **Bremen**, with its outport of Bremerhaven, another important North Sea port, also trades with America and the East in normal times. **Emden**, another North Sea port, has risen to importance in recent times. Important Baltic ports of Germany are **Lubeck**, **Travenunde**, **Stralsund**, **Stettin**, etc. Most of the German ports, particularly those on the Baltic Sea, would be useless in winter

Germany :

North Sea
ports.

Baltic
ports.

Disadvantages of German ports.

were it not otherwise for the use of ice-breakers. And although Germany has been trying hard to develop her own ports, much of her foreign trade still passes through the ports of Belgium, Holland, France, Italy and Yugoslavia. The trade of the mining and manufacturing regions of western Germany passes, in normal times, mainly through Antwerp and Rotterdam.

Port of Danzig and its rival Gdynia.

Danzig, is a Baltic port and the main outlet and inlet for the Vistula Basin. The principal export of Poland through this port are *coal, timber, wood-pulp, paper, sugar and mineral oil*. But the Poles had, for some time past, been developing a port called **Gdynia** outside Danzig.

Norway.

Most of the important Norwegian towns are seaports. **Oslo**, at the head of the Glommen Valley, is the chief port and capital. It has a dock that can accommodate vessels of medium tonnage only. Principal exports are *timber and wood-pulp*. Next comes **Bergen** on the southern part of the west coast. It is a centre of fishing industries, and its principal export is *timber*. Farther south lies the fishing port of **Stavenger**, and farther north is **Trondheim**, the third port of Norway, and in the far north stands **Hammerfest**.

Sweden.

The principal seaport of Sweden is **Goteborg** (or Gothenburg) on the south-west coast. The harbour is fairly deep, but not commodious. The situation of the port, however, is excellent; it is easily accessible from Great Britain, France and Germany. **Malmo**, at the southern end, may be said to stand face to face with Copenhagen, and is nearest to Germany; the bulk of the trade is naturally with Denmark and Germany. **Stockholm**, the capital, is the principal Baltic Sea port. The chief items of Sweden's export are *wood-pulp and paper and timber* (together about 50 per cent), and *metals* (about 30 per cent). The principal town of Denmark is

Denmark.

Copenhagen, a free port now; it has a good natural harbour, and is connected with the Swedish port of Malmo by an excellent system of train-ferry vessels. Copenhagen holds a most strategic position, controlling, as it does, the narrow entrances to the Baltic Sea. With the opening of the *Kiel Canal* (Germany), however, its strategic advantage

has been greatly minimised. **Aarhus** and **Aalborg** are the chief ports on the east of Jutland. **Odense** is the chief port of Fyen. The principal exports of Denmark are *butter, cheese, bacon* and *eggs*.

The chief ports on the mountainous north coast of **Spain**. Spain are **Bilbao** and **Santandar**, noted for the export of good quality *iron ore*. These and other northern ports, however, are always under the possibility of being obstructed by bars, and constant engineering care is needed to keep them open. **Cadiz** and **Huelva** in southern Spain have the command of the Guadalquivir Valley, although **Seville** on the Guadalquivir about 70 miles from the sea is the principal port of the region. The harbour of Cadiz, though accessible to the largest vessels, is not spacious enough for a large number of ships. The harbour of Huelva, on the other hand, is deep and spacious enough for 'a large fleet of the largest vessels', but obstructed by a shifting sand-bar at the mouth of the Rio Tinto. Constant dredging is required to keep Seville open to large vessels. *Wine and dried grapes* are the chief exports of this region. **Malaga**, **Cartagena**, **Valencia** and **Barcelona** are the principal ports of the Mediterranean coastlands of Spain. All these ports possess good natural harbours, rendered more suitable for modern vessels by engineering. The principal seaports of Portugal are Oporto and Lisbon on **Portugal**. the west coast. **Oporto**, at the mouth of the Douro, is famous as 'the port-wine port'. A new harbour has now been constructed a few miles north of the river mouth for large vessels. **Lisbon**, the capital, is at the estuary of the Tagus and its admirable natural harbour is directly accessible for the largest ocean liners of to-day. It is the largest port of Portugal, exporting *cork, wine, fish, oranges, lemons*, etc., and importing *coal* and *manufactured goods* generally. **Gibraltar**, belonging geographically to Spain, **Gibraltar**. is in British hands. It is a rock fortress commanding the gateway to the Mediterranean. Commercially it is important as an *entrepôt* and coaling station, and its docks have accommodation for the largest men-of-war in the British Navy.

- Italy :** The principal ports of Italy are Venice and Genoa.
- Port of Venice.** **Venice**, built upon a number of islets on the shore of the Adriatic Sea, is a natural port. Its entrance is guarded by a line of low sand islands. Two channels, one in the north and the other in the south, now made deep enough for the largest vessels, allow easy access to the port. The hinterland of Venice comprises not only the eastern part of the northern plain, but also extends to the whole of the Po Valley, and Venice, which is connected by railways with Milan and Turin, handles much of the traffic of the Brenner railway. Venice has large ship-building yards as well. The position of **Genoa** on the gulf of that name is very interesting. It is flanked on the north, east and west by the Alps ; a gap through the northern highlands, however, connects it by rail with Milan in the heart of the Po Valley. Railways along the coasts connect it with Pisa, Leghorn, Rome, Capua and Naples on the south-east, and with Savona and the Riviera on the south-west. From Savona a railway line runs direct to Turin in the Po Valley. Genoa has shipbuilding, iron, and cotton works. It has a fine natural harbour, which has been much improved and enlarged. The hinterland of Genoa includes, in addition to a large part of the Po Valley, southern Switzerland as well.
- Ports of Naples, Brindisi, Trieste, and Fiume.** **Naples**, in the middle of the southern half of the west coast, itself an important centre of various manufacturing industries, has a deep and spacious harbour. **Brindisi**, on the south-east coast, was till lately a port of call for mail steamers from the East ; but the service has been discontinued. **Trieste**, at the head of the Adriatic Sea, serves as an outlet for Austria, Hungary and Yugoslavia. **Fiume**, on the Adriatic, also annexed to Italy, serves mainly as a Yugoslav port.
- Malta.** **Valetta**, on the British island of Malta, is an important fortress and coaling-station and considerable *entrepôt*.
- Greece.** **Piræus**, the port of Athens, is said to be the fourth port in the Mediterranean and the principal port of Greece. It has a fine natural harbour. **Salonika**, another Greek port, serves also as an outlet and inlet for the trade of

Yugoslavia. **Patras**, on the Gulf of Corinth, is famous for the export of currants ; it is also a Greek port.

Leningard, with its port, **Kronstadt**, is the chief port ^{Russia.} of the U. S. S. R., on the Baltic Sea. The harbour accommodation of Leningard is not what it should be, and it is at **Kornstadt** that all large ships ride at anchor. A ship canal now gives direct access to Leningard where all but the very largest vessels find a spacious anchorage. **Riga**, till lately the capital of Latvia and now in Russian hands, is also another important outlet for the U. S. S. R. Its harbour has been much improved, although its port for large vessels is *Ust Dvinsk*. **Reval**, the capital of Estonia until that state's recent incorporation into the Soviet Union, is another important outlet for Russia ; the harbour has been deepened and extended. Russia's chief port on the Black Sea is **Odessa**. The chief Caspian port is **Astrakhan**. Another Caspian port is **Baku**, whence oil is sent by pipeline to **Batum** on the Black Sea.

Africa.—The principal port of Egypt is **Alexandria** ^{Egypt.} on the north-west fringe of the Nile Delta. It handles about 80 per cent of the import trade and 90 per cent of the export trade of Egypt. **Port Said**, at the entrance to the Suez Canal, is a considerable *entrepôt* and important coaling station. **Bulak** is the port of Cairo. **Port Sudan**, on the Red Sea coast, handles about 80 per cent of the foreign trade of Anglo-Egyptian Sudan. Nearly two-thirds of its ^{Anglo-Egyptian Sudan.} total export consists of *cotton and cotton seeds* ; other exports are *gum, sesamum, skins, gold, and ground-nuts*. **Massawa**, on the Red Sea, is the port of the Italian colony of Eritrea ; its chief exports are *hides and skins, and pearls*. ^{Somaliland.} **Mogadiscio** is the chief port of Italian Somaliland, whence *gums and hides* are exported. **Berbera** is the chief port of British Somaliland. **Djibouti** is the chief port of French ^{Abyssinia, and Libya.} Somaliland ; it is the terminus of the railway from Addis Ababa, Abyssinia's capital. **Tripoli** and **Benghazi** are the two ports of some importance in Libya. **Oran, Tenes, Algiers, Bougie, Bona, and Tunis** are the ports of ^{Tunis and} Algeria ^{and} Tunisia, which are under French domination. Chief ^{Algeria.} exports from these ports are *iron, zinc, phosphates* and

cereals like wheat and barley. Most of these ports are open roadsteads, although some of them have now been provided with artificial harbours. **Tangier**, on the Strait of Gibraltar, and **Mogador** in the south, **Casablanca**, **Rabat** are the well-known ports of Morocco. **Durban** is the principal port of Natal, S. Africa. It is in the south-east coast region of Africa, which receives its rain from the Trade Winds mainly in summer (Nov.-Feb.). The chief products of the region are *sugarcane*, *cotton*, *tea*, *arrowroot* and *black wattle*. *Coal* is mined in the extreme north of the province, and Durban has become an important coal-exporting port and coaling-station on the Cape Route. Large numbers of Indians have settled here, and large quantities of coal from Durban are exported to Bombay. Other important ports of South Africa are **Cape Town**, **Port Elizabeth**, **East London**, and the Portuguese port of **Lourenco Marques**. Cape Town has a fine natural harbour, which has now been much improved by the construction of an artificial one. It, too, is naturally a port of call on the Cape Route. Lourenco Marques also exports some coal to India. **Dakkar**, in French West Africa, a port of some importance, is the capital of French West Africa. **Freetown**, in Sierra Leone, is at the estuary of the Rokelle river and has a fine natural harbour. It is in British hands. Other West African ports that can only be mentioned here are **Accra**, **Porto Novo**, **Lagos**, **Port Noire**, **Boma**, **Loanda**, **Benguela** and **Swakopmund**, all of which are under one or other of the European powers.

N. America.—**Halifax**, on the east coast of Nova Scotia, has an excellent natural harbour and is the principal naval station of Canada. It remains ice-free throughout the winter in most years. **Charlottetown**, in Prince Edward Island, is another Canadian port with a good harbour. **St. John**, in New Brunswick, is on the Bay of Fundy and possesses a fine harbour, which remains open all the year round ; it is now connected by rail with **Montreal**, the principal centre of commerce in Canada. **Montreal** is on an island on the St. Lawrence some 180 miles

above Quebec. This has contributed to its rapid rise and the consequent decline of the latter city. St. Lawrence has been well dredged for the passage of large ocean-going vessels to Montreal. It is now the largest grain port of Canada after Vancouver. **Quebec**, at the confluence of the Charles river with the St. Lawrence, is, like its rival, Montreal, in command of the second manufacturing region of Canada. **Toronto**, on Lake Ontario, has a fine harbour, and is the capital of the first manufacturing province of Canada. **Victoria** at the south-east end of Vancouver Island has an excellent harbour, and serves as a considerable *entrepôt* on the west of the Dominion. **Vancouver**, at the mouth of Burrard Inlet, has a deep, commodious harbour, from which mail steamers run regularly to Alaska, Seattle, San Francisco, Hawaii, China, Japan, Australia and New Zealand. **Prince Rupert**, on Kai-En Island, is a terminus of the Canadian National Railways. The leading seaports of the U. S. A. in the order of importance are New York, New Orleans, Galveston, San Francisco, Philadelphia, Boston, Seattle, and Los Angeles.¹ **New York** is an admirable port. Like Bombay it is built upon an island, and has a splendid natural harbour, which has been turned into an ideal shelter for the largest ocean-going vessels. The Hudson river flows by it, and the gap thus caused to the north connects New York with Montreal in Canada. At right angles to this gap is another, the Mohawk Gap, which terminates at the confluence of Lakes Erie and Ontario. New York is, thus, directly connected by a splendid series of waterways with all the towns on the Great Lake System of N. America—with Duluth, Port Arthur (Canada), Chicago, Milwaukee, Detroit, Cleveland, Buffalo, and Toronto (Canada). The Delaware Gap, again, connects it with Philadelphia, the Susquehanna Gap with Baltimore, and the Potomacy Gap with Washington. Down the narrow Hudson Valley alone run two canals and four main railways to New York. Of the total foreign trade of the U. S. A., New York alone handles more than 40 per cent. **New Orleans**, on the Gulf of Mexico, though not provided with a good harbour by

Port of
New York.

Port of
New
Orleans.

¹ Chisholm's *Handbook*, p 748.

Port of
Galveston.

Ports of
San
Francisco,
Seattle,
and Los
Angeles.

Ports of
Boston
and Phila-
delphia.

South
America:

Argentina.

Brazil.

nature, has been made accessible for large ships by means of a network of canals. It has direct railway connection with new York and Chicago. It has one of the largest hinterlands in the whole of the U. S. A., and trades in *gunny cloth, rice, bananas, cotton, molasses and sugar*. **Galveston**, also on the Gulf of Mexico, has grown in importance only recently, after the construction of a navigable channel across the bar at its entrance. It, too, has railway connection with all important centres. Large quantities of *cotton* are exported from this port to Britain. **San Francisco, Seattle, and Los Angeles** are on the Pacific coast. San Francisco, in California, is at the head of a fine natural bay, which serves as an excellent harbour, and has a Mediterranean climate. **Seattle**, farther north, is in the region of the timber trade, and has a good natural harbour. Los Angeles, in California, lacks a good harbour and may be described as an open roadstead ; but an artificial harbour has now been constructed. It is a centre of American *oil trade*. **Boston and Philadelphia** are on the east coast. Boston, in the New England region, is a fine bay port, and is the great wool market of America. But the railway routes across the Alleghany Mountains being difficult Boston cannot compete with New York in handling the products of the hinterland around Chicago. Philadelphia, provided with a good harbour, is another centre of the wool trade.

S. America.—**Buenos Aires**, the largest city in South America, is the chief port of the Argentine Republic. But the harbour is not good and has to be kept open at great expense. Its principal exports are *meat, wool, wheat, and dairy products* ; principal imports are *coal, oil and manufactured goods*. **La Plata, Bahia Blanca and Rosario** are other important ports of the Republic. All of them are well served by railways, but none possess a good natural harbour. **Rio de Janeiro**, the chief port and capital of Brazil, has a safe and commodious natural harbour. **Santos**, farther south, is also a Brazilian port of growing importance. **Sao Paulo**, lying immediately behind Santos, is not actually a seaport, but an important centre of textile industries. All these towns are well served by railways. The chief exports

of Brazil are *coffee, maté, meat and rubber*, chief imports, *oil, coal, wheat, machinery*, etc. **Valparaiso**, the port of **Santiago**, the capital of Chile, is situated on a beautiful Chile. bay; chief imports are *foodstuffs and guano*. The ports of **Antofagasta** and **Iquique**, however, handle the greater part of the exports.

Australia.—**Sydney**, the capital of New South Wales, Australia, is the largest town and seaport of Australia. Its harbour, Port Jackson, is one of the finest natural harbours in the world. **Brisbane**, at the head of the estuary of the river of that name, is the capital and chief port of Queensland, Australia. It is accessible to large vessels. **Fremantle**, on the west coast, is the port of call for mail steamers; mails are landed here and sent by train or aeroplane all over the continent except North Australia. **Hobart**, on the south of Tasmania, upon the river Derwent, is the capital of that Tasmania. island and a port of some importance. The Derwent is navigable by the largest vessels. But the chief port of Tasmania is **Launceston** on the north, at the head of the Tamar estuary.

QUESTIONS

1. Describe the Suez Route with the object of showing its commercial value.
2. Discuss the relative advantages and disadvantages of the Suez and Panama Routes from Western Europe to Eastern Asia. Large quantities of jute goods are exported from Calcutta to the Pacific ports of South America. What route do the ships follow for this trade, and why?
3. "The opening of the Panama Canal has brought about many changes in the ocean routes, but by no possibility can it have such an important effect on the commerce of the world and lead to such rapid expansion of trade and traffic as was brought about by the opening of the Suez Canal."—Discuss.
4. "The traffic through the Panama Canal has increased with surprising rapidity in recent years." State briefly the factors that have led to the improvement. What are the principal commodities that pass through this canal? What are the main defects of this route to the East and how are these going to be remedied?
5. Discuss the importance of the Suez Route to India's external trade. How will this trade be affected if the route be temporarily closed?

6. How does the Cape Route compare with the Mediterranean from India to Europe. In what way will India's trade with Western Europe be affected if the latter route is blockaded during a war?

7. State the necessary conditions for the development of good seaports. Apply these considerations to any of the following: (a) Montreal, (b) Fremantle, (c) Shanghai, (d) Buenos Aires, (e) Trieste.

8. Describe the position of any four of the following ports and discuss the parts they play in the commerce and industry of the country they serve: (a) Rotterdam (b) Yokohama, (c) Genoa, (d) Galveston, (e) Buenos Aires.

9. What do you understand by the hinterland of a port? Illustrate your answer by reference to a few ports in the different parts of the world.

10. State the situation and describe the reasons for the importance of any five of the following: (a) Buenos Aires, (b) Danzig, (c) Durham (d) Chicago, (e) Hobart, (f) Sydney, (g) San Francisco, (h) Vancouver, (i) Yokohama.

11. State the situation and mention the geographical circumstances giving importance to any five of the following: (a) Glasgow, (b) Danzig, (c) Mosul, (d) Singapore, (e) Hong kong, (f) Durban, (g) Los Angeles, (h) Buenos Aires, (i) Brisbane.

12. "The importance of a port depends upon the extent and the productiveness of its hinterland."—Discuss.

13. Account for the importance of any four of the following: (a) Harbin, (b) Colombo, (c) Manchester, (d) Chicago, (e) Warsaw, (f) Minneapolis.

14. What factors make for the successful development of a river port? Give a few conspicuous examples.

15. Indicate clearly the geographical circumstances giving importance to the following:—(a) Hamburg, (b) Lisbon, (c) Brindisi, (d) Alexandria (e) Durban, (f) Sydney, (g) San Francisco.

PART—II

CHAPTER I

AUSTRALIA AND POLYNESIA

AUSTRALIA

Position and Size.—Australia is the largest island in the world and smallest of the continents except, of course, the barren, snow-covered territory of Antarctica. Even including the islands of Tasmania, New Guinea and New Zealand and the numerous islands that lie scattered over the vast open expanses of the Pacific Ocean,—a group often described collectively as the continent of Oceania—it is perhaps the smallest continent. The area of Australia proper, including Tasmania, is **3 million square miles**, *i.e.*, four-fifths that of Europe. The coast-line is remarkable for its general compactness ; good harbours are, therefore, lacking. Certain outstanding features relating to its position must be noted : the continent lies entirely in the *Southern Hemisphere* far away from all other continents ; the *Tropic of Capricorn* passes through the northern third of the continent, so that while one-third of the territory lies in the Tropics, the southern two-thirds is in temperate latitudes. And here we must guard against a possible misconception : although in the Southern Hemisphere, Australia does not lie at the fringe of the Antarctic Circle ; in a topsyturvy world it would occupy the position of the Sahara Desert, and the island of Tasmania would very nearly touch the northern fringe of Spain, because the positions occupied by them in the Southern Hemisphere correspond to those of the Sahara and northern Spain in the other. The longitude of 135°E. is the central meridian of this island continent. The **Commonwealth of Australia** is almost coincident with the **Continent of Australia**. The Commonwealth is a federation of 8 states : (a) Queensland (b) New South Wales (c) Victoria (d) Northern Territories (e) West Australia (f) South Australia (g) Tasmania (h) Australian Capital Territory (Canberra). It is a dominion within the British Commonwealth.

Australia
and
Oceania.

Area.

Coastline.

Tropical
and
Temperate
parts

Antipodes.

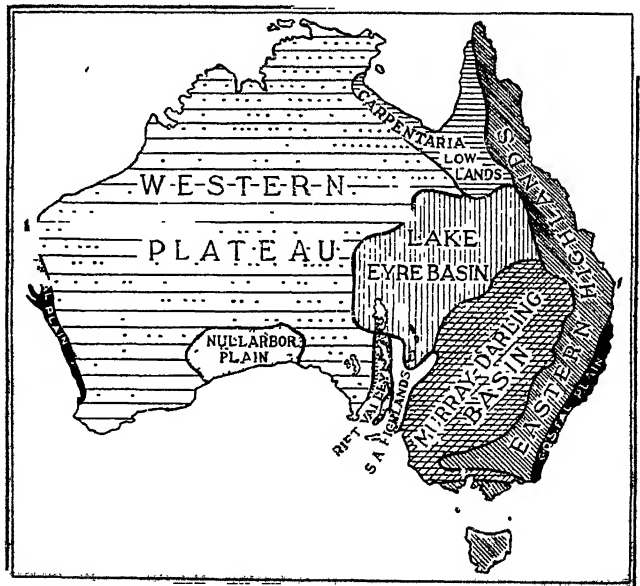
Central
Meridian.

Common-
wealth and
Continent.

Physical Features.—Topographically considered, Australia can be divided into three natural regions :

**Western
Plateau.**

(a) **The Western Plateau Region**, consisting of a vast mass of ancient metamorphic rocks. The average elevation of the plateau, however, is variously stated to be between 600 and 1,500 feet, or between 1,000 and 2,000 feet above sea-level. This huge block covers more than half the total area of the continent, sometimes descending direct into the sea, and at other times leaving marginal spaces for narrow coastal plains.



The Physical Regions of Australia.

**Central
Lowlands.**

(b) **The Central Lowlands**, formed by the *Carpentaria Lowlands* in the north, *Lake Eyre Basin* in the middle, and *Murray-Darling Basin* in the south. The **South Australian Highlands**, consisting of a series of hills running in a general north-south line, form an interruption in the south-central plains of the Murray and Darling. To the west of the Highlands is the *Rift Valley* of Australia.

(c) **The Eastern Highlands**, formed by a series of ^{Eastern} block mountains and possibly by some pre-Tertiary fold ^{Highlands} mountain ridges as well. The slope of these mountains is from east to west. The western slopes form the great grass-land region of Australia, and the famous **Darling Downs** of Queensland are only a part of this important region. The whole range is known as the '**Great Dividing Range**', although the different parts have different names, such as *Australian Alps*, *Blue Mountains* etc. Towards the south these ranges curve in a westerly direction, throwing out parallel ranges to the south. In the northern part the ranges directly reach to the sea, while in the southern part they leave space for an extremely narrow but very important *coastal plain*. Since the continental shelf upon which the mainland of Australia stands is also the platform, geologically, of the mountainous island of Tasmania, it may be regarded as a detached mass of the Eastern Highlands.¹

Australia is singularly deficient in large rivers. Those of the north coast like the *Fitzroy*, *Roper*, *Mitchell*, *Flinders* ^{Rivers and} and *Victoria* are all tropical rivers fed by the periodical ^{Lakes.} (monsoon) rains and all of them lack a steady supply of water. The principal river of the west coast is the **Swan**, 200 miles long, at the mouth of which stands the city of Perth. Most of the permanent rivers, however, are in the east and south-east, the Trade Wind region of Australia, where the rainfall is heaviest and where the rivers are fed by the melting snow of the Eastern Highlands. The *Fitzroy*,² *Brisbane*, *Hawkesbury*, *Hunter*, *Clarence* and, above all, **Murray** and **Darling** are the principal rivers of this region. The main stream of the Murray is 1,300 miles in length ; rising in the south of the Eastern Highlands, it flows in a west and north-west direction until deflected to the south by the Flinders Mountains lying ahead ; after turning to the south it drains into the sea through *Lake*

¹ The island of New Guinea to the north of the mainland also stands on the same continental shelf, which is separated by a deep sea line from the Asiatic shelf on the one hand and 'hat of New Zealand, on the other. Most of the East Indian islands belong to the Asiatic shelf.

² There are two rivers of that name (Fitzroy) in Australia.

Alexandrina. The source of the Darling is more than 2,300 miles from the sea ; it drains into the Murray with its many affluents from a north-easterly direction. Other important tributaries of the Murray are the *Murrumbidgee* and the *Lachlan*. Several streams of Australia like the *Diamantina*, the *Cooper's Creek* and the *Eyre's Creek* drain into **Lake Eyre**, in the heart of the Central Lowlands ; but in the dry season these generally dry up, leaving the lake basin an unhealthy swamp. The surface of the Lake Eyre Basin is below sea-level.

Metallic
minerals
gold,
copper,
lead, zinc,
tin, silver,
wolfram,
iron etc

Geology and Minerals.—The Western Plateau region is composed of ancient metamorphic (crystalline or old, hardened sedimentary) rocks, resistant to denudation. As we have noted in an earlier chapter the metalliferous minerals tend to be associated with these rocks. The widespread occurrence of **gold** in the Western Plateau regions is, therefore, not at all surprising ; the three important gold fields of this region are those at *Kalgoorlie*, *Coolgardie* and *Cue* (Murchison goldfield). Gold is plentiful in the eastern parts as well, since the Eastern Uplands, though perhaps of more recent origin (probably Palæozoic or Cambrian &/ or Mesozoic or pre-Tertiary), are also formed by crystalline or metamorphic and other hard rocks. The famous goldfields of *Ballarat* and *Bendigo* are in this region. Other important metallic minerals are **copper** (Queensland, Tasmania and the eastern states), **Silver** (Queensland, New South Wales, Tasmania), **lead** (Queensland, New South Wales, Tasmania), **zinc** (New South Wales), **wolfram** (Queensland), and **iron** (generally distributed). Of all the iron deposits those of the famous *Iron Knob*, a hill of iron ore in South Australia, is the most important. The Central Lowlands of the continent are formed by young, soft, sedimentary rocks of the post-Tertiary or later Cainozoic age (probably Miocene &/or Pliocene). Non-metallic minerals like coal and oil usually tend to be associated with young, sedimentary rocks,¹ and thus on the flanks of the Eastern Highlands in the region of

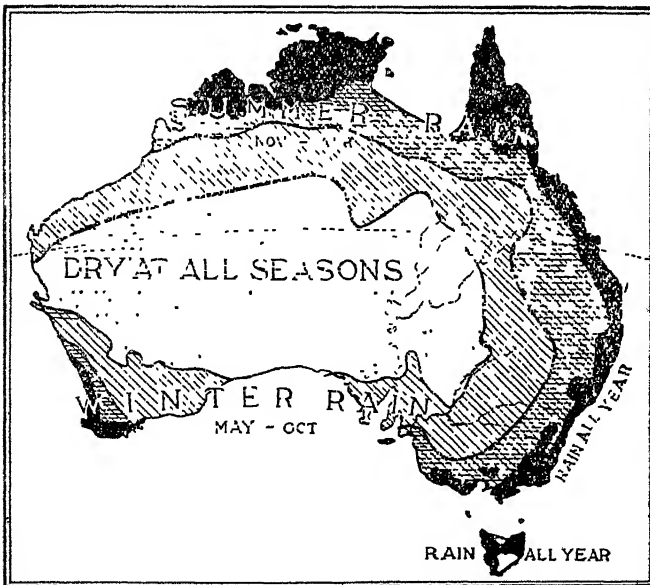
Non-
metallic
minerals
coal.

¹ Mineral oil occurs mostly in the margin of Alpine fold mountains.

Queensland and New South Wales occur large deposits of coal. The most important coal basin is near *Newcastle*, No oil in New South Wales. But no oil has as yet been discovered in Australia.

Climate.—Australia is a topsy-turvy world, lying south of the Equator, where it is mid-winter in July and blazing hot in January. The Tropic of Capricorn, we have seen, passes through the heart of the continent. So during the summer months (Nov.-April) the sun shines vertically almost over the centre of the mainland, where the average shade temperature soars as high as 80°F., and in some parts well over 90°F. All over the enormous central territory, and particularly in the north-west coast, low pressure

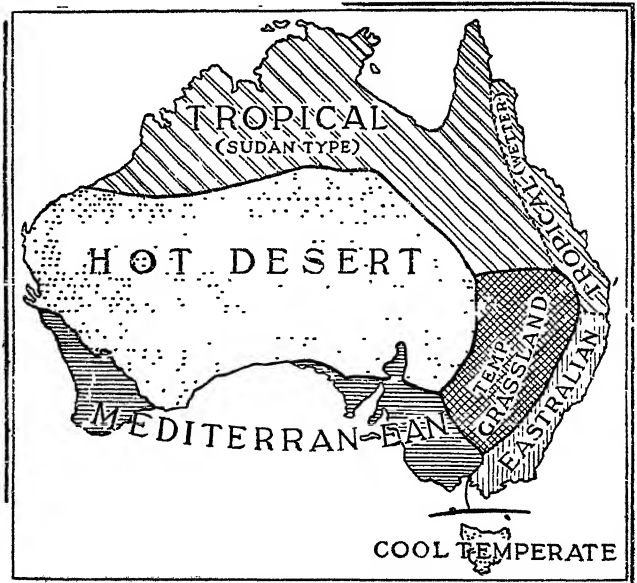
Conditions
in Hot
Season.



Rainfall in Australia.

centres of varying barometrical gradient are formed accordingly, to which the cool, rain-bearing winds flow from the Indian Ocean to the north and west. This is the North-west

Monsoon of Australia. The northern fringes of the north-western coastlands receive a good rainfall—sometimes as much as 40" annually ; but it is progressively light towards the interior, the greater part of which lies beyond the monsoonal range. Nearly the whole of the east lies in the belt of the South-east Trade Winds ; but the Great Dividing Range cuts off these winds, so that only the narrow coastal areas receive a good rainfall (40") all the year round. The vast interior of the continent is thus exceedingly dry at all seasons. The east coast, especially the southern half of it, has a marine climate. The southern coast also remains dry during the hot season, because the passages of the westerlies (N. W. Anti-Trade Winds) shifts too far to



The Climatic Regions of Australia.

the south to blow over the mainland, although they bring rain to Tasmania. The southern fourth of Australia is, however, not so hot during the summer months as the northern three-fourths, partly because of their relative

distance from the Tropic of Capricorn and partly because of occasional cool winds from the Antarctic. As the sun moves farther and farther towards the Tropic of Cancer during the Australian winter (May-Oct.), the earth's thermal equator begins to shift to the north, and because of the resulting fall in temperature over the greater part of the continent, high pressure centres are formed in the interior, particularly in the south-east. But the northern fourth of the continent keeps relatively hot with an average temperature of 80°F. Obviously the heavy air over the heart of Australia will flow towards the hotter north, and owing to the general northerly swing of the world's wind systems during this season, the entire north actually comes under the influence of the S. E. Trade Winds which blow, except in Queensland, from the dry interior. These dessicating winds bring no rain to the north. The southern part at this season comes in the belt of the N. W. Anti-Trades, which thus bring winter rain to this region. This is, therefore, the Mediterranean region of Australia. The rainfall is fairly good, varying, as it does, normally between 40" and 20" annually. Tasmania, always in the westerly wind belt (Anti-Trade belt), has rain all the year as do the east coast of the mainland owing to the Trade Winds from the Pacific.

Conditions
in Cold
Season.

Natural Vegetation.—Combining all these data we find that Australia can be divided into at least six climatic regions : (a) there is, first the *Tropical Climatic Region* in the north and north-east with a climate of the Sudan type. The coastal areas are generally fringed with mangrove swamps ; farther inland there are Monsoon forests (evergreen), which eventually pass into rich grasslands or savanas. (b) In the heart of the continent prevails the *Hot Desert Climate* with its characteristic spiny grass and scrub. (c) The *Mediterranean Climate* prevails in the south, especially along the south-eastern and south-western coasts, where fine forests are sometimes seen. (d) South of the tropical grasslands and covering the greater part of the Murray-Darling Basin occurs the *Temperate Grassland Climate* ; in the wetter parts of this region tall trees are

Six Natural
Regions.

found. (e) Along the southern half of the eastern seaboard lies the region of the *Eastralian Climate*, where the natural vegetation is eucalypt forest. The Eastralian type of climate is closely similar to the China type, but characterized by milder winter and rainfall at all seasons. (f) The island of Tasmania has a *Cool Temperate Oceanic Climate* like that of the British Isles.

Typical
Vegetation.

Amongst the plants particularly characteristic are the several varieties of the eucalyptus tree ; the '*mallee scrub*' covering vast areas of the Desert Region is a stunted eucalyptus tree with small leaves that are arranged vertically ; in the wetter parts—especially of tropical Australia—on the contrary, exceedingly tall varieties of the eucalyptus plant, yielding very hard wood, not eatable by white ants, grow luxuriantly. In the Mediterranean regions the **karri** and **jarrah** forests are very important, and on the hill slopes generally there are the fine **blue gum** forests. The '*mulga*' is a stunted **acacia** plant, occurring extensively like the '*mallee*' in the dry interior. The tall **Kangaroo grass** and various other herbs like the **salt bush**, notable for their capacity to stand long drought, are nutritious food for sheep. But the Australians have upset the balance of the plant world by the introduction of the succulent prickly pear to provide fodder for sheep and cattle in the drier parts ; this has now resulted in the invasion of wetter regions by this wild plant.

Prickly pear
menace.

Tropical
animals.

Animal Life.—But even still more characteristic are the animals of Australia. The several varieties of the **Kangaroo**, the **platypus**, the **emu**, the **dingo** and other animals and birds are unknown in any other continent. Some of these animals, particularly the kangaroo, yield furs of some value. The colonists have almost wiped out the land mammals of Australia for obtaining the fur. Animals from Europe have now been introduced, especially the sheep and the rabbit. There being no wild animals except the dingo to prey upon them, they have multiplied at an enormous rate. And although the increase in number of the sheep has been beneficial to Australia's wool industry, the

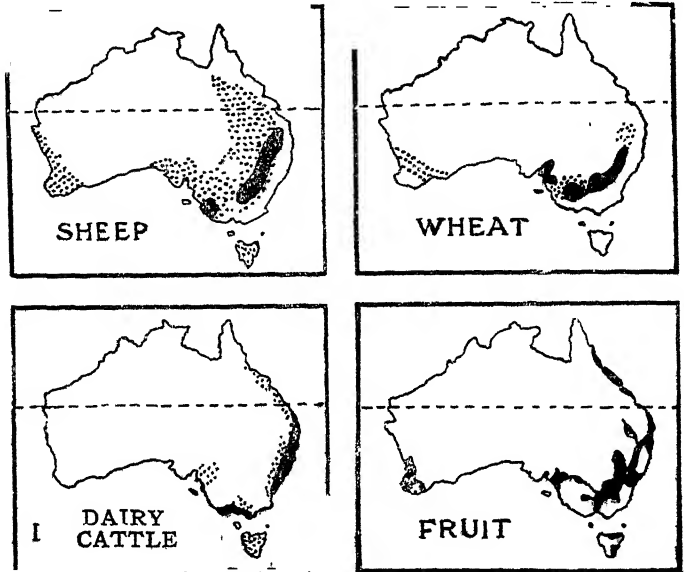
rabbits have grown to be a serious menace to pastures and orchards, and in western Australia an enormous wire fence, 2,000 miles long, has been put up to keep them out.

Primary Production.—Although Australia as a whole is rich in minerals, primary production is a factor of major importance in the national economy of the Dominion. On an average, between 20 million and 25 million acres of land are under crops in Australia. Owing to small population nearly three acres are cultivated for each inhabitant. Owing to uneven distribution of rainfall there is no agriculture in the Central and Western part of the country. The absence of crops along the north coast is due to poor soils, difficulties of transport and lack of labour. The chief agricultural regions lie in Queensland, New South Wales, Victoria and South and South-Western Australia. Irrigation is largely practised. The leading agricultural products are **wheat and fruits**. There are two major wheat belts—^{Wheat Belts.} one occupying the south-western Mediterranean region and the other extending from the south-eastern Mediterranean region through the temperate grasslands (Murray-Darling Basin) to the eastern fringes of the wetter tropical lands. The highest concentration of wheat is, however, to be found in this second belt. Various tropical fruits, including *banana* and *pineapple*, as well as the tropical *sugar-cane*,^{Fruit Regions.} are largely grown in Queensland in north-east, especially along the east coast of that state. But more important from the point of view of national economy are the Mediterranean fruit-growing regions of Victoria, South Australia and Western Australia. Deciduous fruits like *peaches*, *apricots* and *apples* are grown chiefly in the northern parts of the temperate grasslands, while farther south are found citrus fruits and plants like *oranges*, *lemons* and the *vine*. Wine is produced from the vine, but does not form an important item of export ; but peaches and apricots are exported, after drying and tinning ; apples are also exported, chiefly from Victoria and Tasmania.

Besides agriculture, cattle farming and sheep rearing are very important. On the tropical glasslands of the north

Cattle
farming
and sheep
rearing.

are kept a limited number of **beef cattle** ; but of much more importance are the cattle lands of the south ; **dairy-farming** is most extensively carried on in Victoria and the well-watered south-east coastlands. Australia's leading export is **wool** ; there are, we are told, no less than a hundred



million sheep in the continent, and most of these are confined to the two great sheep-rearing belts of western and eastern Australia ; the largest concentrations of sheep are in the temperate part of the continent and the south-eastern Mediterranean region.

Manufacturing Industry.—The development of manufacturing industry in Australia is only in the pioneer stage. Iron and steel industry has developed due to the need for munitions of all kinds. Factories have been established at New Castle, Port Kembla (45 miles south of Sydney) and Wryalla (South Australia). These factories smelt ore from iron knob. The works at New Castle and Port Kembla produce annually about 700,000 tons of pig

iron and more than 1 million ton of steel. Want of cheap and skilled labour is a handicap.

Textile mills are located in Victoria and New South Wales. Victoria has made much progress in textiles and in the boot and shoe trade. Other industries in Australia are connected with wood, machinery and food.

Population.—The aboriginal Australians are allied to the pre-Dravidian races of Southern India, the Vedda of Ceylon, the Sakai of the Malay Peninsula and a few other races of Oceania. Whether they were ever very numerous we cannot positively say ; but it is now definitely known that they came very near total extinction in the hands of the first white settlers from Europe. Their total number is now estimated at 60,000. Driven out of the more fertile and well-watered regions, most of them now live in the north and west 'as do also the 20,000 half-castes'. The earliest British settlers were convicts sentenced to penal servitude for life ; the first batch consisting of 850 men and women, mostly hardened criminals, arrived at Botany Bay, New South Wales, in 1788, and to them fell the task of developing the resources of the continent. No wonder that the aborigines should be cruelly hunted down like game animals. Came the Napoleonic Wars and the Industrial Revolution with the consequent maladies of unemployment, food shortage, riot and what not, and the Government of Great Britain, eager to be relieved of the hungry millions, persuaded them to emigrate to Australia and other parts of the Empire. The discovery of gold in the eighties of the last century subsequently led to a gold rush which eventually culminated in extensive settlement.

The present population is a little over 8 millions with an average density, in an area of 3 million square miles, of only two and a half to the square mile. Nearly all the settlers are from the British Isles. Turning to the distribution of population we find that, more than half the total population is concentrated in the capital cities such as Melbourne, Sydney, Perth, Adelaide and Brisbane. The density of population is nowhere high except in Victoria.

The basin of the Murray-Darling is fairly densely settled

AREA AND POPULATION (1950)

States and Territories (Capital in brackets)	Area (in sq. miles)	Population	Per 100 sq. miles
New South Wales (Sydney)	309,433	3,225,242	1,042
Victoria (Melbourne) ..	87,884	2,202,869	2,507
Queensland (Brisbane) ..	670,500	1,183,792	177
South Australia (Adelaide)	380,070	700,257	184
W. Australia (Perth) ..	975,920	557,918	57
Tasmania (Hobart) ..	26,215	279,386	1,066
Northern Terri. (Darwin)	523,620	15,303	3
Australian Capital Terri- tory (Canberra) ..	939	20,772	2,212

Distribution of population especially in the wetter South and East. This uneven distribution of population is due to economic, political and physical factors. The central part of Australia is a desert and, as such, unfit for human habitation. The Northern territory is incapable of close settlement by the white races due to climatic difficulties. This part of Australia can be developed economically, if Asiatics are allowed to settle here. But the "*White Australia Policy*" of the Government of Australia as a result of which the introduction of all coloured labour has been prohibited, stands in the way. It is estimated that Northern territory, if developed, can support more than four times the population of Victoria. But the average European settler will prefer to stay in the non-tropical parts of the continent, until the latter becomes so far saturated with population that the pressure to go elsewhere is much greater than at present. So the chances of the Northern territory being filled up by European immigrants is very remote. This region is likely to remain economically undeveloped for a long time to come for want of labourers.

Labour question & White Australia Policy.

Railways.

Communications.—The surface of Australia is, on the whole, fairly level, consisting, as it does, of vast plateaus and extensive plains. Railway communication would, therefore, be easy were it not for the Great Dividing Range which acts as the chief obstacle to communication with the

interior. Another difficulty standing in the way of establishing through communications is that different railway systems already existing are on different gauges. These systems have been joined up actually, but through communication has not yet been established. Since the continent offers suitable conditions for road-making, extensive highways and motor tracks are now being built all over the territory. Trans-continental airways have also been developed, and the continent is now connected with the vast outer world by means of trans-oceanic airways. The principal air services of Australia are the (a) Melbourne—Hobart Service, (b) Cootamundra—Charleville Service, (c) Perth—Adelaide Service, (d) Cloncurry—Normanton Service, and (e) Brisbane—Darwin—Singapore Service which is connected with Imperial Airways to London.

Foreign Trade.—Australia is a vast territory that is very thinly populated. Naturally, therefore, enormous areas lie undeveloped. It is still essentially a pastoral and agricultural country, and the industries it has developed are mainly occupied with the exploitation and utilisation of pastoral and agricultural produce. Consequently, the export of Australia consists chiefly of its natural products and the bulk of the imports consists of manufactured articles.

The principal commodities exported from Australia are butter and cheese, wool, wheat and flour, meat, fruits, milk and cream, metals and ores etc. The principal commodities imported are tea, tobacco, cotton piece goods, stationery goods, paper, machinery and mill work, motor cars and parts, petroleum, jute and jute bags, drugs and chemicals etc., etc. The major portion of the trade is with the U.K. and Commonwealth countries. The share of the U.S.A. is increasing recently.

Australia is now in regular trans-oceanic communication with Asia, Europe, Africa and America. Steamers from Asia, Europe and Africa call first at Fremantle, Western Australia, for unloading the mails, which are then sent by train to all parts of the continent except North

Australia. From Fremantle the steamers proceed along the south to the east, calling at Adelaide, Melbourne, Sydney, and Brisbane. Steamers taking the north-eastern route call at Brisbane first. This is the less important route, and is followed mainly by tramps. Although different routes are used for trade purpose, most of the ships to and from Australia now pass through the Suez Canal and along the south coast of Australia (contrast New Zealand). The most convenient port of departure for the Panama Canal route from Australia is Sydney.

**Economic
products.**

TASMANIA, now a state of the Australian Commonwealth, is a small island 120 miles from the extreme south of the mainland. It is about the size of Ceylon or Ireland. Being a continuation of the Eastern Highlands of Australia, it is a mass of mountains interspersed with small fertile valleys here and there. The island is rich in important minerals like *copper, silver, lead, gold and tin*. The climate is much like that of the British Isles. The principal agricultural products are *wheat, barley* and *fruits*. The highlands are covered with fine *forests*. The capital and chief port is **Hobart**, which has an excellent natural harbour at the estuary of the Derwent. **Launceston**, at the head of navigation on the Tamar, is another important port.

NEW ZEALAND

The Brighter Britain of the South

NEW ZEALAND is a British Dominion, consisting of two large islands, called the **North** and the **South Islands**, and a much smaller one to the south known as **Stewart Island**, together with several groups of still smaller islands in the South Pacific Ocean. The total area of the Dominion is 105,000 sq. miles, and it lies almost at the centre of the Water Hemisphere of the globe as the British Isles are at the centre of the Land Hemisphere. In fact, New Zealand is the only part of British Empire, that resembles Great Britain in its size, climate, habits and scenery. Hence it is often referred to as the "Brighter Britain of the South." Although nearly as large as the British isles, its population consists of only about one and a half million of people. Both Great Britain and New Zealand lie in the westerly wind belt and both have their most mountainous side on the West, with the result that they have hills and mountains enjoying a heavy rainfall on the West and over plainlands on the East. New Zealand is nearer the equator than the British Isles and on the whole enjoys a more equable and rather warmer climate. As in Britain, no part in New Zealand suffers from drought. The agricultural products of New Zealand are, therefore similar to those of England (the chief corn crops, wheat and oats). A further illustration of the similarity between the climate of New Zealand and that of England, is presented by the success with which various breeds of English sheep yielding long, strong and silky fibres, are reared on the New Zealand pastures.

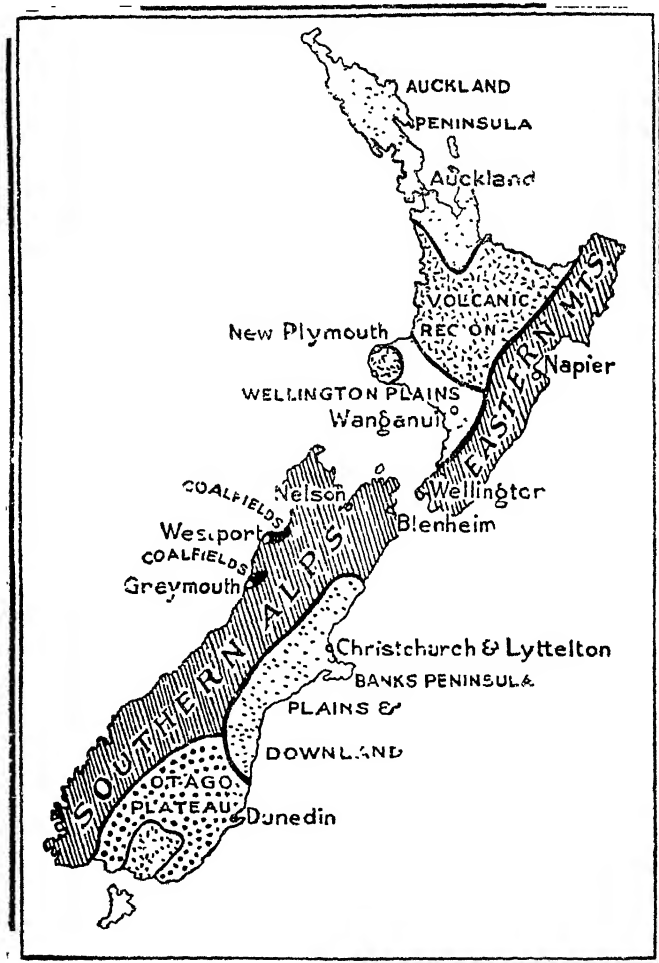
Surface Features.—The most characteristic feature of New Zealand's surface relief is a **mountain backbone** running right through the two main islands ; in the North

Position &
Size.

Comparison
of New
Zealand
with Great
Britain.

Surface
Relief.

Island this backbone, known as the **Eastern Mountains**, runs by the east coast, and in the South Island, where it



The Natural Regions of New Zealand.

has been given the name of **Southern Alps**, it is near the west coast. Bordering the Eastern Mountains on the west and covering a large part of the central region of the North Island is an extensive area of volcanic rocks. In the south-east of the South Island lies the Otago Plateau. Many of the peaks of the Southern Alps are over 10,000 feet above sea-level and are always covered with snow. The two major plains of New Zealand are the **Canterbury Plains** of the South Island and the **Wellington Plains** of the North Island ; to these may also be added the well-watered rolling country of the **Auckland Peninsula**. There are numerous rivers in New Zealand, but most of them are too rapid for navigation. The *Molyneux* or *Clutha* is the largest river of the South Island ; but the chief navigable river, the *Waikato*, is in the North Island. Rivers.

The whole of the Dominion, except perhaps the extreme northern end, lies, like the British Isles, in the **Westerly Wind Belt**. But New Zealand is nearer the Equator than the British Isles, and therefore, enjoys a warmer and sunnier climate. Unlike Australia, New Zealand never experiences drought. We can distinguish six natural regions in New Zealand : Climate. Natural Regions.

(a) **The Southern Alps Region**, occupying the western parts of the South Island. Owing to abundant precipitation (over 70") the mountains are—unless, of course, too high—covered with thick forest, little exploited as yet. Rainfall, however, is progressively less towards the east. **Mountain pastures** lie scattered over the whole region, especially in the drier parts to the north-east. Valuable minerals such as **gold, copper, coal and greenstone** are also found in this region ; but mining industries are still in the infant stage.

(b) **The South Island Grassland Region**, covering not only the Otago Plateau and the Canterbury Plains, but also the Banks Peninsula in the east, and Downland in the north of the Plains ; the two small strips of coastal land at the northern end of the South Island may also be included in this region. It is the chief seat of New Zealand's pastoral and agricultural industries ;—even on the com-

paratively poor Otago Plateau sheep-rearing and agriculture are of prime importance. The climate being, on the whole, similar to that of the British Isles, various English grasses have been introduced in this region and elsewhere for feeding the sheep. Sheep are kept for both **wool** and **mutton**. The chief agricultural products of this region are **oats** and **wheat**, the former associated naturally with the colder and poorer lands mainly of the Otago Plateau and the latter with the warmer, and richer lands of the Canterbury Plains and the small coastal strips.

(c) **The Eastern Mountains Region** of the North Island. Although the mountains here are lower, the whole region is topographically more varied. The Eastern Mountains, in contrast to the Southern Alps, lie in the drier side of the North Island. Unlike the latter, again, this region abounds in pastures suitable for sheep, and is another important **wool-and mutton-producing** region of New Zealand.

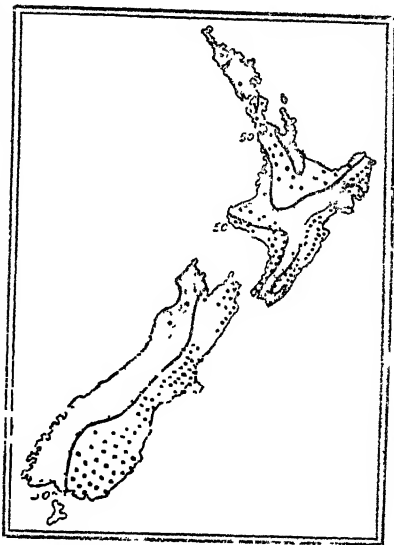
(d) **The Wellington Plains**, to the south of the volcanic region, have a large concentration of sheep and a fairly large number of cattle, and are among the chief **dairying** regions of the Dominion.

(e) **The Volcanic Region**, to the north of the Wellington Plain and east of the Eastern Mountains, occupies the heart of the North Island. Hot springs and geysers abound and there are many volcanoes, some still active but most of them now extinct. The soil is poor and dry except in the south where small concentrations of sheep are seen.

(f) **The Auckland Peninsula**, to the north of the Volcanic Region, occupies the northern parts of the North Island. This is the only region of New Zealand, except a few of the smaller Pacific islands, which has a warm climate akin to the Mediterranean type. The forested parts of the Peninsula formerly yielded much **Kauri-gum**, prepared from the resin of the Kauri trees. These are the only forests of New Zealand that have been thoroughly

exploited. **Grass** suitable for cattle naturally grows here, and it is, therefore, one of the principal **dairy-farming** regions of the Dominion. Mediterranean fruits and plants like the **vine**, **orange**, and **lemon** are also cultivated here ; but wine is rarely distilled. Some minerals are found, chiefly **gold**.

The total **population** of the Dominion is about a million and a half, the bulk of the population is of British descent, the aborigines, called the **Maori**, numbering some 70,000. These latter are a tall, slenderly built, intelligent stock of the **Polynesian** races, and are characterized by **mesaticephalic** features generally.

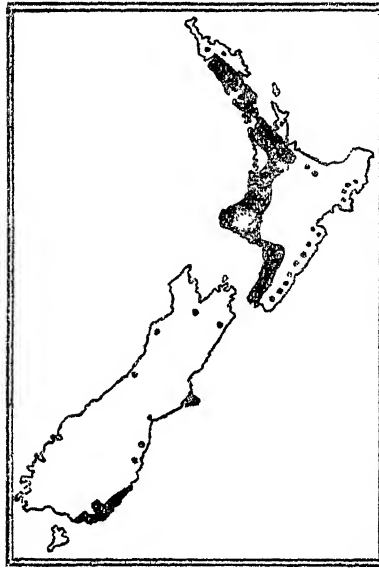


The Concentration of Sheep
in New Zealand.

The capital of the Dominion is **Wellington** at the southern end of the North Island on the Cook Strait which reaches the city in the form of an inlet forming an excellent commodious harbour ; its port is **Port Nicholson**. **West-port** and **Grey-mouth**, on the north-western coast of the South Island, serve the coal areas of the Southern Alps Region. **Dunedin**, on the east coast of the South Island, with a population of 89,000, is the port of the Otago Plateau. **Christchurch**, with its port of **Lyttelton**, is the chief city of the Canterbury Plains ; it has a population of 132,000. **Nelson**, at the head of the Tasman Bay, serves the small sheltered valley on the west of the main mountain chain of the Southern Alps. **Blenheim** similarly serves the valley on the east of that chain. Both the towns—Nelson and Blenheim—lie at

Towns of
New
Zealand.

the northern end of the South Island. **Auckland**, on a narrow isthmus of the peninsula of that name, is, with a population of 223,000, the largest town of New Zealand ; it is a calling-station for steamers between Australia and America.



Dairy-farming Regions.

Trade &
Industry

tions are the Lake Coleridge station in the neighbourhood of Christ-church, the Waikato River Works near Hamilton and the Mangahoe installation near Wellington.

Exports.

More than 80 p.c. of the exports of the country consists of the four principal (items)—**wool, mutton, butter and cheese**. About three-quarters of the total export trade is with Great Britain, which, in its turn, supplies nearly half the total imports of New Zealand. While the exports consist almost solely of raw materials of lesser value, the bulk of the imports consists of manufactured goods of high value.

Imports.

The principal foodstuffs imported are sugar, tea and fruits ; principal raw materials, tobacco and cigars, petroleum and oils and fertilisers ; chief manufactures imported are textiles (cotton, wool and silk goods), apparel,

New Zealand is essentially a pastoral and agricultural country, and its prospects of industrial development are still very remote. But it has, for its size, large potential water-power resources, which, if and when fully developed, would supply 4,750,000 horse-power ; at present, however, something like 950,000 h.p. is being utilised. The principal installa-

cars, machinery, paper and books, iron and steel, rubber tyres and tubes and chemicals and drugs.

THE ISLANDS OF THE PACIFIC

NEW GUINEA, with an area of nearly 300,000 sq. miles, is the second largest island in the world after Australia. Its western portion, comprising about one-half of the total area, is in Dutch hands. The southern portion of the eastern half, together with the **Louisiade Archipelago**, is a British Crown Colony, now officially known as the '**Territory of Papua**' and administered by the Commonwealth of Australia. The north-eastern portion, known as **New Guinea**, was formerly in German hands, but has been placed under the control of Australia by a mandate of the League of Nations. The whole island lies in the Equatorial region and receives abundant rainfall, with the result that the lowlands are covered with hot wet evergreen forests. The interior is a tableland and the narrow south-eastern extremities are traversed by mountain chains—the *Owen Stanley Range*—rising to altitudes of 13,000 feet and more in some places. The tableland for the interior, much of which still remains unexplored, is said to be covered with dense tropical grasslands. The *Fly* and the *Sepik* are the two great navigable rivers, serving as natural highways to the interior. The chief agricultural products of the island are **bananas, yams, sugar-cane, coconuts, taro** and some **tobacco**. Some minerals are found, notably **gold**. The trade is small ; the chief exports are **copra, gold, rubber, trepang** and **pearl-shell**. The gold is alluvial and worked by Europeans, mainly in the Louisiade Archipelago. **Port Moresby**, the capital and port of Papua, has regular ocean communication with Australia. The natives belong to what for want of a better and more precise term is called the Melanesian race. They are, despite racial intermixture, basically of Negrito descent, usually short, dark, and long-headed, and perhaps of an indolent disposition. The great obstacles to the development of the island are its climate and the scarcity of labourers, to which we must add the not always har-

Political
Divisions.

Physical
Features.

Production
& Trade.

Questions
of develop-
ment.

monious interests of the Dutch, German and British planters. Otherwise the island offers opportunities for development as much as Ceylon and Jamaica.¹

Chief
groups.

People

Political
Divisions

MELANESIA, meaning 'Islands of the Blacks', is a name given to several groups of small islands lying to the east and south-east of New Guinea. These are grouped under the names of **Bismarck Archipelago, New Caledonia, Solomon Islands, New Hebrides &c.** Most of these islands are of volcanic origin and bordered by coral reefs; the general nature of the surface relief is characterized by the presence of mountains. The climate is of the Equatorial type, but much tempered by oceanic influences. The natural products, however, are more of a tropical nature than equatorial, represented in the main by **bananas, yams, coconuts, sugar and cotton.** Some minerals are found, notably **nickel**, in New Caledonia.² The natives belong to the Papuan stock and are said to practise cannibalism and head-hunting; but the fact seems to be that they are primarily an agricultural folk who occasionally resort to food-gathering and hunting in order to supplement their meagre rations. Even these remote islands, on the other hand, now bear ample witness to the greater 'cannibalism' of Europe. The Bismark Archipelago was formerly in German hands; now it is under British 'protection'. New Caledonia is French. Solomon Islands were, before the last War, partly German and partly British; now they are wholly in British hands. The New Hebrides are under the 'joint protection' of France and Britain. Melanesia comprises various other groups of islands, too numerous to mention; of these the Loyalty Islands belong to France; the Admiralty Islands, together with the islands of New Britain and New Ireland, actually form parts of what was formerly known as the Bismark Archipelago; the islands of the Solomon group, which were formerly under Germany, are now administered by the Australian Commonwealth, while the original British possessions in that group are adminis-

¹ Chisholm

² The two chief sources of the world's nickel are Ontario in Canada, supplying about 3/4 of the total, and New Caledonia which supplies the bulk of the remainder.

tered by Great Britain. **Noumea**, in New Caledonia, is a port of call on the route to Australia.

POLYNESIA, meaning 'many islands', is the general name given to the innumerable islands of the Pacific not grouped under the term, Melanesia. These are either of volcanic origin or of coral formation. Nearly all of them are located within the tropics and have abundant rainfall. They are—most of them—covered with dense tropical vegetation, and their chief agricultural products are **yams**, **cocoanuts** and **breadfruit**. The principal export is **copra**. Some minerals are found, notably **phosphates**. The natives belong to the so called Polynesian race (or races?), of which there are two main stocks; the one stock, akin to 'the more European-looking Maori', is tall and slender and characterized by long head, open eyes, light skin, thin lips and narrow but high nose; the other stock is shorter, darker, relatively coarse-featured and slightly brachycephalic or mesaticephalic. The total area of the group is over 7,000 sq. miles, and the total population of nearly 200,000 consists, besides the natives, of a few thousand Europeans, Indians and, of course, half-breeds. The chief products are **cocoanuts**, **sugar**, **bananas**, **rice**, **pineapple** and **cotton**. A brisk trade has grown up. **Suva**, in the island of Viti Levu, is the capital and chief port with a fine harbour protected by coral reefs. **Levuka**, in another island, is also a considerable port with a fine natural harbour. The island of **Nauru** was formerly German; it is now administered jointly by Great Britain, Australia and New Zealand according to the League mandate. The **Tonga** or **Friendly Islands** are a British protectorate. The **Society Islands**, of which the island of **Tahiti** is the most important, the **Low Islands** and the **Marquesas** group are under French protection. The **Marshall**, **Caroline**, **Pelew**, **Marianne** or **Ladrone** Islands were formerly ruled by Japan according to the League mandate.¹ The **Ocean** island and the **Gilbert** and the **Ellice** groups are ruled by Great Britain as protectorates. The

¹ The island of Guam belonging to the Mariane group, however, belongs to the U. S. A.

Cook or **Hervey** Islands now form a part of the Dominion of New Zealand. The **Fanning** and **Christmas** Islands as well as the **Penrhyn** Island (formerly German) are also British. The **Samoan** or **Navigator** Island and the **Hawaiian** or **Sandwich** Islands are owned by the U. S. A. The total area of the Hawaiian Islands is 6,500 sq. miles ; the population of nearly 385,000 consists of various peoples —Japanese, Chinese, Portuguese, Filipinos, Americans and the natives. Of these various peoples the Japanese alone constitute nearly 40 per cent, while the natives and half-breeds constitute only 6 and 9 per cent respectively.¹ The whole group is very mountainous ; but the climate is pleasant. The principal agricultural products are similar to those of the Fiji Islands. **Sugar** and **pineapples** are the chief items of export. The bulk of the trade is naturally with the U. S. A., of which the Hawaiian Islands are now regarded as a territory, and thus share the former's customs tariff. The chief imports, almost wholly from the U. S. A., are **wheat**, **flour** and **pork**. The imports are free of duty.

QUESTIONS

- 1 Describe carefully, with the aid of sketch maps, the distribution of sheep in Australia, and New Zealand. Under what conditions does this animal thrive best?
2. Describe the principal industries of Australia, including agriculture
3. Give an explanatory account of the distribution of population in Australia.
- 4 Why does not Australia, which is a large producer of wool, develop extensive woollen manufactures?
5. Discuss the development of east and west coasts of Australia and show how far the influence of climate is responsible for such development.
- 6 What are the principal exports from Australia and New Zealand? Discuss the possibilities of increased exchange between these countries and India.
7. Compare New Zealand with Great Britain in respect of (a) Geographical situation (b) Superficial configuration (c) climate (d) products and (e) density of population.
8. "Isolation and a small population have been potent forces in retarding the development of Australia".—Discuss.

¹ Chisholm's Handbook, p. 830.

CHAPTER II

THE AMERICAS

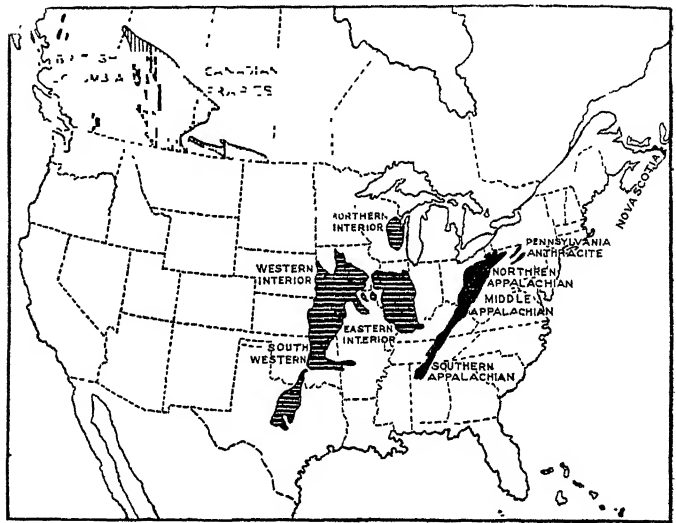
THE NEW WORLD

North America

Position and Size.—North America has an area of about 8 million sq. miles. Its position is best defined by three lines of latitude and longitude : the **Arctic Circle** runs through the north of the continent across Alaska and Greenland ; the **Tropic of Cancer** cuts through the southern tip of California and the middle of Mexico ; and the longitude of **100°W.**, passes through the heart of the continent from north to south. The coastline is longer, relatively to area, than that of either Africa or Asia.

Physical Features.—North America falls into three broad physical divisions : (a) *The Rocky Mountain System* of the west is constituted by a series of Alpine fold mountains and intervening plateaus. In the north there is the **Coast Range** bordering the narrow and broken coastal plains ; then there is the **Selkirk Range**, and in between the two are a number of small plateaus. Further east is the **Rocky Mountains**. Between the Coast Range and the Rocky is the **Plateau of Yukon**. In the middle region of the system is the **Coast Range** bordering the Pacific Ocean ; then there is the **Cascade Range** and the **Sierra Nevada** ; and farther east is the main mountain chain of the Rocky. The **Plateau of Columbia** and the **Colorado Plateau** lie in the intervening space. Farther south lies the **Plateau of Mexico**. (b) *The Central Plains* of North America are constituted by the lowlands round the Hudson Bay in the north, the lowlands round the Gulf of Mexico in the south, and in the west by the gradually rising plains adjoining the Rockies. (c) *The Eastern Highlands* are constituted by the **Appalachian System** of

Mountain and the Plateau of Greenland and the Laurentian Plateau (or Plateau of Labrador).



The Coalfields of North America

Geology and Minerals.—The Rocky Mountain System is formed by Alpine fold ranges and plateaus of ancient rock formation. Naturally, therefore, it is associated in places with various minerals such as **gold** in the Yukon, **silver** in Mexico, and a variety of minerals in the United States. **Oilfields** also occur on the flanks of the mountain chains. The great 'Canadian Shield' is a mass of ancient crystalline rocks, in many places highly mineralised ; and so a large number of minerals such as **iron**, **copper**, **silver**, **gold**, **cobalt**, and **nickel** are found in that region also. The Appalachian Mountains are also formed of ancient rocks, and on the western side of them lie the richest known **coalfields** in the world. Important **oilfields** also occur on the flanks of the Appalachians. Oilfields are most important in Louisiana, Texas and California in the U. S. A. Mexico also has some oilfields.

Climate.—The warm North Pacific Drift flows along the west coast of North America, keeping it warm. The

west coast is also under the influence of the warm, moist Westerly Winds (S. W. Anti-Trades); but the Rockies act as an effective barrier and prevent them blowing inland. The heart of the continent is, however, open to Arctic influences in winter. The climate of the interior is continental. The south-eastern parts of the continent are under the influence of the N. E. Trade Winds. Rainfall is rather heavy on the northern part of the west coast and the Pacific slopes of the Rockies, since the region lies in the Westerly Wind Belt, and, therefore, has rain all the year round. So also does the eastern sea-board, which is under the influence of the N. E. Trades. But in the interior precipitation occurs mainly in summer; while the eastern half of this region has a fair share of rain, the western half is exceedingly arid. A small part of the west coast, however, has winter rain.

THE STATES OF N. AMERICA CANADA

Canada is a British Dominion. It is over $3\frac{3}{4}$ million sq. miles in area and has a population of about 14,000,000. It stretches from the Arctic Ocean on the north to the boundary of the U. S. A., on the south, and from the Pacific shores on the west to the Atlantic shores on the east. Thus the whole territory is entirely outside the tropics, and in this Canada offers a sharp contrast to Australia, another British Dominion. It readily falls into the three broad physical divisions enumerated above: there is the *Rocky Mountain System* in the west; farther inland is the great *Central Plains*; and in the east are the *Eastern Highlands*. (a) **The Rocky Mountain System** roughly coincides with the province of British Columbia. The whole region is mountainous; the coastal areas are often deeply fiorded and separated by narrow straits. Of the numerous islands that lie in this region Vancouver is the largest. It is a region of the S. W. Anti-Trades, and thus receives abundant rainfall; but the distribution of rainfall is governed by topography with the result that while the exposed mountains

receive an abundant supply of moisture, the sheltered plateaus and valleys lie in their rain-shadow. The warm North Pacific drift flows by the coast keeping it warm. The mountains are often covered with coniferous forests yielding good quality *pine*, *fir* and *cedar*. Lumbering is, therefore, an important industry in this region.

Central
Plains.

(b) **The Central Plains** roughly coincide with the three *Prairie* Provinces of Alberta, Manitoba and Saskatchewan. In the north only there is an area of lowland round Hudson Bay. The Central Plains are for the most part, neither flat nor low-lying. But the surface is smooth and the land rises very gently and gradually towards the west. The height is nowhere less than 500 ft. and in most places over 1,000 ft.

Eastern
Highlands

(c) **The Eastern Highlands** are much lower than the western mountains. They fall into two parts, the Canadian shield and the Northern Appalachians of the Maritime Provinces, separated by the estuary and the lowlands of the St. Lawrence.

The Canadian shield, with an area of nearly 2 million sq. miles, occupies more than half the total area of Canada. The greater part of the shield is composed of ancient crystalline rocks. The greatest height is found in N. W. Labrador, where it rises to over 6,000 ft. The surface of the shield is very rugged. The St. Lawrence Valley which separates the Canadian shield from the Maritime provinces is a long, flat-floored, narrow depression. The Appalachian mountains of the Maritime provinces consist of a series of parallel ranges separated by wide valleys.

Climate.

Climate.—The climate of Canada is controlled by its latitude, its size and its relief. The whole of the country falls within the cool temperate belt. In the north it has sub-Arctic and Arctic conditions. Except the Western coastal areas, the winter over the whole of Canada is both long and severe and the seasonal range of temperature is very great. The west coast has a cool temperate western marginal type of climate, with rainfall at all seasons and moderate temperatures. The rain is caused by the westerly

winds. Although the rainfall on the Coastal Ranges is over 80 inches a year, the average annual rainfall is 60 inches. The warm North Pacific Drift keeps the climate equable. East of the Rockies the climate becomes markedly continental in character. While the Rockies effectively shut off the moderating influence of the sea, there are no mountain ranges on the north to obstruct the chilly Arctic winds from entering the land. The winters in Central Canada are very cold while summers are warm. The heat of summer is greater in the South. In winter the temperature for the coldest month falls upto 0°F. and the ground remains frozen for at least one month each year. Rainfall in Central Canada is very light, decreasing from about 25 inches a year in the east to about 12 inches a year in the south-west of Alberta. Most of it comes in the summer and the winter is dry. The climate in eastern Canada is less extreme than that of Central Canada. But the St. Lawrence remains frozen for at least six months in one year. This is due mainly to the fact that winds blow offshore during winter from the frozen interior of the country. Moreover, the cold Labrador Current flows southwards past the St. Lawrence from Davis Strait. The eastern and southern coasts of Nova Scotia and New Brunswick remain ice-free even during the coldest months. The rainfall is uniform and moderate at all seasons (average 50 inches a year).

Agriculture.—It is easily the most important industry of Canada. Agricultural products form almost 40 per cent of the total exports. The vast stretches of fertile soil in the prairie lands and the climatic conditions are highly suitable to the growth of cereals (edible grain).

Wheat is the most important crop of Canada. Though occupying the sixth place in the production of wheat, Canada is now definitely the largest exporter of the commodity of the world. Wheat is grown here in two varieties —“Winter Wheat” and “Spring Wheat”. Winter wheat is sown in autumn and reaped the following summer. It has larger yield per acre than the other variety, which is sown in the spring and harvested in autumn. Spring wheat is

grown mainly in the Prairie Provinces of Manitoba, Saskatchewan and Alberta. Ontario, British Columbia and parts of Alberta grow winter wheat. The one great defect in the areas of wheat production in Canada is the occurrence of droughts from time to time.

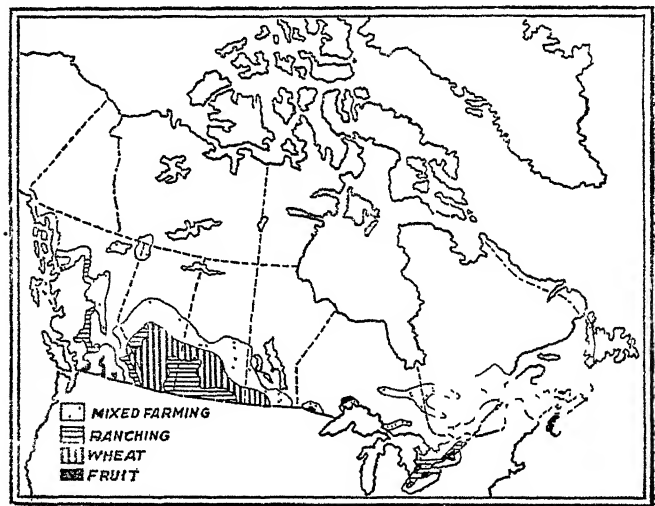
Oats

The second most important crop of Canada—Oats are grown in Saskatchewan, Ontario, Alberta, Quebec and Manitoba. They occupy half the acreage under wheat and are grown mainly as cattle fodder but are used also for breakfast foods.

Barley and Maize.

Barley is grown mainly in the wheat-growing provinces and maize is almost solely confined to Southern Ontario.

Other minor crops are flax grown in Saskatchewan mainly for its seed, sugar-beet in Alberta and Ontario and tobacco in the Lake Peninsula.



Agriculture of Canada.

Fruit growing is also an important industry in Canada where the Lake Peninsula of Ontario (lying in the same latitude of Northern Spain and Italy) grows apples, pears, plums, peaches, apricots, grapes and many small fruits. British Columbia has many sheltered valleys, and fruit-farming is becoming increasingly important.

Fishing is one of the leading commercial industries of Canada. Canada's fisheries which are regarded as the third most important in the world, fall into three divisions (1) The Atlantic fisheries. (2) The Pacific fisheries. (3) The Lake fisheries.

Cod is the most important fish of the Atlantic but Atlantic haddock, herring, mackarel, salmon and other fishes are also abundant. The shores of the Atlantic are the most extensive lobster-fishing grounds of the world. Whale and Seal are found off the coast of Labrador.

The Pacific fisheries contribute 40 per cent. of the total Pacific yield of the Canadian fisheries. Salmon is by far the most important fish found there. Hallibut and Herrings are also caught.

The rivers and lakes of Canada abound in trout and other fish. The great lakes contain trout, salmon, herring etc. and are prolific in their yield. Fish-canning is an important industry in Canada.

Lumbering.—The great forests of Canada produce excellent timber in large quantities. The most important lumbering provinces are British Columbia, Ontario, Quebec, and New Brunswick. Lumbering is generally carried on in winter. The timber is drawn over the hard frozen marshes in winter and floated down the rivers to the saw-mills in Spring. Ottawa (Ontario) and St. John (New Brunswick) are the leading centres for saw-mills and the rivers of the same name are the busiest timber rivers in Canada. The soft wood conifers yield fine wood-pulp for the manufacture of paper, and Canada is the largest exporter of this commodity now. Furs also constitute an important forest product. The forests in the North are the home of many animals whose thick furry coats protect them from the severe winter cold. The fur traders penetrate into these regions and trap the animals or buy the skins from the natives. Through these fur traders much of the interior of Canada has come to be known.

**Beef
Cattle**

Stock raising is also very important in Canada. Beef cattle are reared in large number in Alberta and Saskatchewan. There is an abundant supply of fine grass which provides food for the cattle all the year round.

**Dairy
Cattle**

In the Eastern provinces of Ontario and Quebec, cattle are reared in large number for the dairy produce, especially cheese and butter, which are important exports. Here the pastures are richer than the Prairies ; but there is one difficulty, that is the winter being cold the cattle is to be housed.

Sheep.

Ontario and Quebec rear about 60 per cent. of Canada's sheep, though sheep rearing is not a large-scale industry in the country owing to the severity of cold in winter.

Minerals.

Mining.—Canada is rich in minerals, both useful and precious. But the development of these resources is not yet satisfactory. The development of these resources is chiefly dependent on transportation facilities, but is also influenced by economic considerations. For example, it is cheaper for Ontario and Quebec to import coal *via* the great lakes from the U. S. A., than to obtain it from the mines of the country. Canada ranks second in the production of gold, among the countries of the world. It is one of the few countries in the world where the output of gold is increasing. The chief gold-producing areas are Ontario, British Columbia, Quebec and the Yukon. Nova Scotia has some gold but it is not very important. Copper is mainly obtained from British Columbia, producing more than 50 per cent. of the total Canadian output. There are also large deposits in Ontario and western Quebec. It is often found associated with gold. Silver is found in British Columbia and Ontario. The Dominion stands first in the world as a producer of asbestos and nickel. Nickel output is obtained almost entirely from the Sudbury District of Ontario. 90 per cent., of the total world supply of the mineral is from Canada, and it also contributes 95 per cent., to the world supply of asbestos, which is entirely mined in S. W. Quebec. Lead and Zinc are obtained chiefly from British Columbia and deposits also exist in Manitoba and Ontario.

Canada is well provided with useful minerals of which Coal is the most important. It is chiefly found in (1) Nova Scotia and New Brunswick, (2) Alberta, (3) British Columbia, (4) Vancouver Island. Potential fields also exist in Saskatchewan, the Yukon and New Brunswick. The Coal fields of Nova Scotia, which furnish about 40 per cent., of the Canadian output, are associated with valuable deposits of iron. The coal of this place is of excellent quality and much of it is exported to U. S. A., and Newfoundland. Iron ore is obtained from Texada Island, Ontario, Alberta and Saskatchewan besides Nova Scotia.

Petroleum is found in small quantities in Alberta, Ontario and New Brunswick. The output is increasing in Alberta and petroleum is also being exploited in the low Mackenzie valley of the far North.

The other minerals of minor importance in Canada are Platinum and Radium.

Industries.—Want of capital and smallness of markets due to sparsity of population, and the great attraction of the food producing industries retarded the growth of manufacture in Canada in the pre-war days. In more recent years, however, the dominion has made rapid progress in the development of manufacturing industries on a large-scale, assisted by her abundant power supply in the form of coal and water-power and the expansion of her extensive railway system. To-day Canada is the leading manufacturing country of the British Empire over-seas, although still her chief industries are flour-milling, meat-packing, dairying, fruit-preserving, fish-canning, sugar-refining etc., which are nothing but elaboration of food products. Winnipeg is the flour-milling centre. Toronto, on Lake Ontario is also a great centre.

Next to the food-producing industries come those industries which utilise wood and wood products. Canada is now the greatest manufacturer of newsprint in the world. The abundance of timber has given rise to the industry of saw-milling at numerous waterfalls. Ottawa

and Hull are the important paper-making and saw-milling centres.

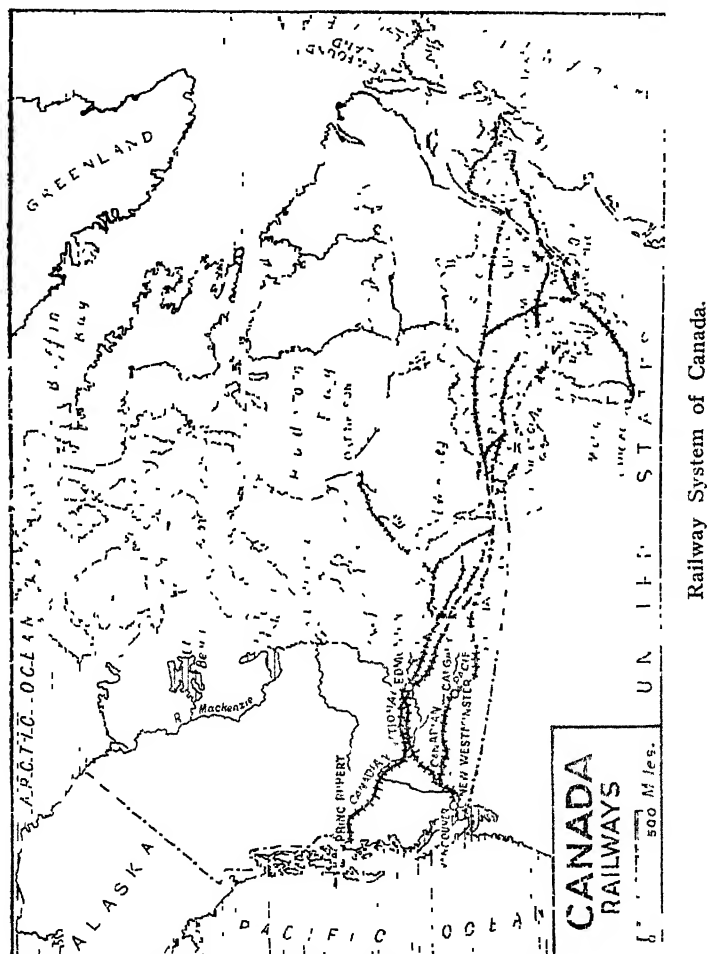
Iron and
Steel
Manufac-
ture.

Manufacture of leather, cotton and woollen goods and manufacture of iron and steel goods are now growing in importance. Quebec and Montreal in Quebec are the most important industrial centres. Large Iron Works have been established at Sydney in Cape Breton Island, Pictoto at Novo Scotia and New Glasgow where local iron is smelted with local coal. Steel as well as Iron is now manufactured at the Sault Sainte Marie falls in Ontario, and at Hamilton and Midland. The manufacture of Motor cars and parts, railway plants and agricultural machinery are also becoming very important. Canada is also fast developing its Ship-building and Aviation industries.

Water-
ways.

Communication System.—Of the waterways of Canada, the most important is that afforded by the St. Lawrence and the Great Lakes. The St. Lawrence has been dredged until it now has a minimum depth of 30 ft. With the help of several canals, of which the most important are the New Welland Canal, between Lakes Ontario and Erie, and the Sault Sainte Marie—commonly known as the Soo Canal, between lakes Haron and Superior, navigation is possible upto Port Arthur. Between Montreal and Lake Ontario, navigation is restricted to boats only, the depth being near about 14 ft. only. There is a project under consideration for opening a deep sea waterway from Montreal to the Great Lakes. The St. Lawrence system provides more than 2000 miles of waterways to Canada. This river, despite its importance, has several drawbacks, such as the freezing of the estuary in winter months, the great force of the current, presence of rapids and the frequency of fog, etc. The other rivers, namely the Mackenzie, the Nelson—Saskatchewan, the Red river of the North, etc., are navigable but as most of them freeze in winter and the depth not being very great, they are of local importance only. The other lakes of Canada namely Winnipeg, Athabaska, Great Slave and Great Bear may increase in importance with the opening up of the Northern Land.

The economic growth of Canada is to a great extent the result of development of the railway system. The railways of Canada, with the exception of the *Canadian Pacific*, are owned by the Government. This railway is the longest in Canada (3500 miles) and joins the Atlantic



Railway System of Canada.

Coasts of Canada with its Pacific Coast. The line runs from Halifax and St. John to Montreal. From Montreal it goes to Winnipeg, the great wheat centre of Canada. From Winnipeg, it reaches Medicine Hat in the rockies. Leaving

Railways.

Medicine Hat, the line goes through Kicking Horse Pass and ends in Vancouver. The *Canadian National Railway* forms a trans-continental route from Halifax to Prince Rupert, entirely within the Canadian territory. From Halifax it goes to Winnipeg via Quebec and thence to Edmonton which is rapidly becoming a railway centre. From Edmonton the line crosses the Rockies by the Yellowhead pass and runs down the Skeena valley to Prince Rupert, where a large port has been established on one of the best natural harbours of the Pacific Coast.

The main line of the *Canadian Northern Railway* starts from Montreal and goes by way of Ottawa to Port Arthur. From there it runs to Winnipeg, entering the U. S. A. for a short distance and from Winnipeg to Edmonton. It then strikes across the Yellowhead Pass and turns South and goes to Vancouver via Thompson and Fraser valleys. This line carries the grain traffic of Canada.

The innumerable branch lines have played a large part in opening up the agricultural areas of the West. Railways also cross the artificial frontier between Canada and the U. S. A. and thus link up the two systems. The project of joining Prince Albert and Port Churchill, Hudson Bay, will also be helpful to Canada's agriculture.

Exports.	Trade and Commerce. —The principal exports of Canada are wheat, woodpulp and paper, timber, nickel, motor cars, copper, fish, fruits, etc. The U. S. A., and the United Kingdom take between them over 75 per cent. of Canadian exports. The imports are more diverse than exports. The chief commodities imported are petroleum,
Imports.	coal, iron and steel, sugar, electrical apparatus, cotton and woollen goods, automobile parts, machinery, etc. Over four-fifths of the imports are from the United States and the United Kingdom. The U. S. A., supplies alone 67 per cent., of the imports.

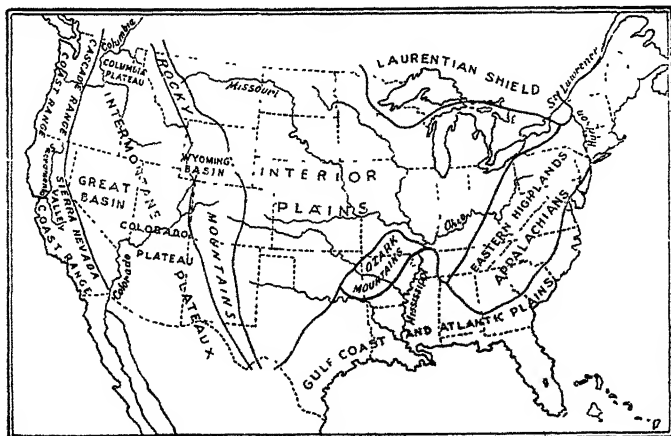
THE UNITED STATES OF AMERICA

The United States of America extends from the Canadian borders on the north to the Mexican borders

on the south, and from the Pacific coast in the west to the Atlantic coast on the east. It includes 48 states, and holds sway over Alaska, the Phillippine Islands and the Hawaiian Islands. The whole territory of the union has an area of 3,738,500 sq. miles. The area of the U.S.A., excluding Alaska and overseas territories is over 3 million sq. miles. With its eastern seaboard fronting the Atlantic and its western seaboard facing the Pacific, the country is favourably situated as regards trade with Asia and Europe. The coastline is very long and there are numerous good harbours specially along the eastern coast. Population is over 150 million.

Physical Features.—The whole territory of the union falls into three broad physical divisions : (a) the *Rocky Mountain System* in the west, (b) the *Central Plains* and (c) the *Eastern Highlands*.

The *Rocky Mountain System* is formed by Alpine chains and the intervening plateaus of Columbia and Colorado. In many places these ancient rocks are highly mineralized and yield vast quantities of minerals.



The Physical Regions of The States

The *Appalachian Highlands* on the east also consist of well-marked ranges and valleys. East of these highlands there is a coastal plain which is broadest in the south.

The *Central Plains* stretch across the country from the Appalachians to the foot of the Western Mountains. It is really a wide plateau, rising gradually towards the west. The altitude is nowhere less than 500 ft. and in most places over 1,000 ft. It is drained by the Mississippi and its tributaries.

Climate

Climate and Vegetation.—The *West Coast* has an equable type of climate. In the northern pacific provinces rainfall occurs throughout the year due to the westerlies. The maximum rainfall is in winter. The southern Pacific province of California has the Mediterranean type of climate with a winter rainfall from the westerlies. The average annual rainfall is about 40 inches. The *Central plain* has an extreme climate and is subject to severe cold in winter. The summer temperatures are specially high. But the heat increases progressively from north to south. The Central plain enjoys a fair rainfall in summer when the heated interior attracts wet winds from the Gulf of Mexico. But the amount of rainfall is inadequate for agriculture. Desert and semi-desert conditions prevail in the intermontane plateaus. North-eastern U.S.A., has the Laurentian type of climate. Rainfall occurs all the year round because of the N. E. trades and is well-distributed. The South-eastern states of the U. S. A. have a moderate rainfall all the year with a marked summer maximum. Nearly 43 per cent. of the total area of the Union is under *forests*, and both *softwoods* and *hardwoods* are fairly evenly distributed over the forest regions. About 38 per cent. of the surface is classed as *grassland*, of which the *Prairies* alone account for nearly five-sixths. Desert and semi-desert lands cover about 14 per cent. of the entire land surface, and a little over 5 per cent. is classed as scrubland. But strangely enough the United States is now largely dependent on foreign supplies of wood-pulp and paper. These are obtained mainly from Canada.

Geology and Minerals.—The Rocky Mountain System is composed of folded rocks of all ages. The Appalachian mountains are formed of ancient rocks. A part of the Laurentian shield is found in the north near the Canadian

border. With the exception of the above portion, the whole of the Central Plains consists of sedimentary rocks but slightly folded. The Western Mountain System consists of a highly folded complex rocks of varying ages.

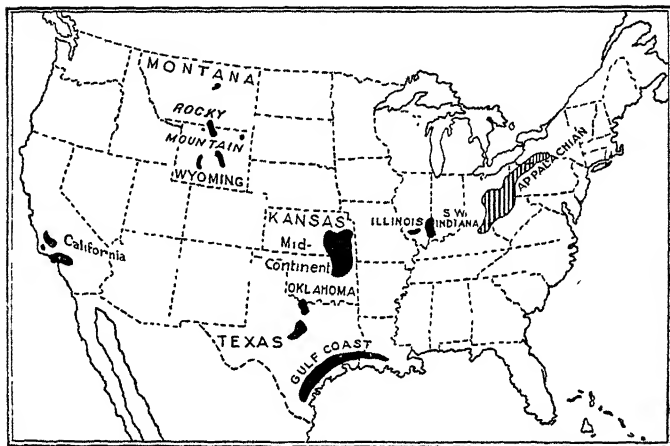
Minerals of various kinds, especially those of industrial **Minerals.** importance, are found in abundance. The U. S. A., is more than self-sufficient in coal, iron and petroleum. It leads the world in the production of copper, lead and zinc. Valuable metals like gold and silver are found in large quantity. In 1950 the total value of minerals raised was estimated at 1,101,000,000 dollars.

Coal—More than one-third of the total annual coal **Coal.** production of the world is raised from the U. S. A. More than half of her coal is obtained from the Appalachian coal-field, which lies in the eastern part of the country. It extends from Pennsylvania, through western Virginia, Kentucky, Tennessee into Alabama. The coal is easily worked. Good quality anthracite is found in E. Pennsylvania. The remainder of the Appalachian coal is bituminous. In the middle west there are two fields, one in Illinois, Indiana and west Kentucky and the other stretching from Iowa to Arkansas. There are also small fields in Michigan, Colorado, Wyoming, California and in the western part of the Gulf region in the south-east. About 95 per cent of the coal raised is consumed within the country.

Iron is most abundant in the states of Michigan, Minnesota and Alabama. The total output of iron-ore from the U. S. A. is now about 47 per cent of that of the whole world. The ore from the Lake region is shipped *via* the Great Lakes, to the heavy industrial area within the Chicago-Buffalo-Pittsburgh triangle. The presence of iron **Iron ore.** and coal in close proximity in Alabama, has led to the development of an important iron and steel industry around and near Birmingham in the South.

Oil—The U. S. A. is by far the most important producer **Mineral** of mineral oil with a steady output of nearly two-thirds of **oil.** the world's total. Of the huge output about 70 per cent

comes from the three states of Oklahoma (25 per cent), California (24 per cent) and Texas (21 per cent). Other important centres in order of production are Kansas, Louisiana, Wyoming, Illinois, and Kentucky. At one time the Appalachian fields supplied a huge quantity of oil but the production at present is insignificant. Despite huge home consumption, the U. S. A., exports large quantities of petroleum and petroleum products.



The Oilfields of the United States

Copper.

Copper—The United States is the leading producer of copper with about 35 per cent of the world's output per annum to its credit. It is found mainly in the Laurentian rocks of Michigan and in Arizona, Montana, Utah, Nevada and California.

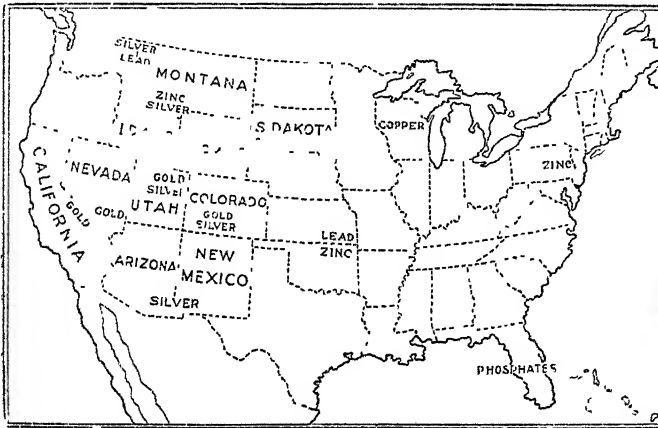
Gold.

Gold—It is found mainly in Alaska, California, South Dakota, Colorado, Utah, Arizona and Nevada. The U. S. A., is one of the leading gold-producing countries of the world and the production has increased recently after a decline.

Silver.

Silver—The U. S. A. ranks second among the silver-producing countries of the world. The chief centres are Utah, Idaho, Montana, New Mexico, Arizona, Colorado and Nevada.

Lead—The U. S. A. ranks first among the lead-producing countries of the world. The normal annual production is one-third of the world's total output. The principal areas of production are the Joplin district of Missouri, Idaho and Kansas, whilst large quantities are produced alongside silver in Utah.



The Metalliferous Minerals of the United States.

Zinc—The U. S. A., produces over 25 per cent of the world's supply of zinc, the principal areas of production being the Joplin district in Missouri, Franklin Furnace (New Jersey) and Montana.

Other Metals include Aluminium (mined in Arkansas), Other Platinum, Antimony and Mercury. A variety of precious metals and stones is also found. non-metals.

Among the non-metallic minerals salt (Michigan, New York, Ohio, California and Utah), sulphur (Louisiana and Texas), phosphates (Florida) etc., rank high in importance.

Among the minerals of industrial importance the U. S. A., is devoid of Tin, Manganese, Nickel and Chromium.

Agriculture.—The United States is the leading agricultural producer in the world and its output of grain, cotton and tobacco, etc., exceeds that of any other country. Although the relative importance of agriculture has declined,

it will be erroneous to call the U. S. A. a pre-eminently industrial country. Twenty-one per cent. of the people gainfully employed are engaged in agriculture and receive about 18 per cent. of the national income.

The main agricultural regions lie in the eastern half of the country, where the rainfall is fairly abundant. The western half is too dry for crops and so are devoted to sheep-rearing and stock-farming. In the Pacific coastal areas fruits and grains grow.

Wheat. **Wheat** is the most important crop. There are two markedly distinct belts. The "spring wheat" belt lies to the north-west and is a continuation of the Canadian prairie wheat region. The "winter wheat" belt lies south of the corn-belt and north of the cotton-belt. Most of the wheat in U. S. A., is winter wheat. This crop is also grown in the N. W. states of Washington and in the Californian valley. The most important wheat-producing states are North Dakota, Kansas, Washington, Montana, Oklahoma, Nebraska, Ohio and Illinois.

Maize **Maize** or Indian corn occupies the largest acreage under crops in the U. S. A. It grows mainly in the Central states. Iowa, Nebraska, Illinois, Minnesota, Missouri, Indiana, Ohio and E. Kansas are the leading producers. The greater part of the total output is used as food for cattle, pigs and sheep. The maize belt is the chief cattle and pig-rearing region of the country. The U. S. A., is the world's largest producer of maize.

Cotton. **Cotton.**—The U. S. A. produces over 50 per cent of the total world crop. It is grown mainly in the south-east where the "Gulf" type of climate prevails. The state of Texas is now the largest producer. Other important cotton-producing states are Georgia, Louisiana, and Carolina. California and Arizona in western U. S. A., grow cotton under irrigation. The average yield per acre is 160 to 170 lbs. Cotton is the most important "cash crop" of the U. S. A. Nearly 50 per cent of the total output is exported.

Tobacco. **Tobacco** is another important crop of the U. S. A. The important producing states are Kentucky, Tennessee,

North and South Carolinas and Virginia. The U. S. A. produces about one-third of the world's total annual output. There is a large export trade.

The minor crops are Oats (cool, moist northern states), Minor Rye (Lake states), Barley (associated with spring wheat), crops. Rice (under irrigation in Texas, Louisiana and California), Sugarcane (Louisiana and Texas), Sugar beet (New York, Utah, Michigan, Ohio and California) and Fruits (California and Florida).

Manufacturing Industries.—The United States is now the most important manufacturing country of the world. This premier position has been attained mainly due to the abundant supplies of coal, iron and other metals and of raw materials in general. The manufacturing districts lie mostly in the East. The North-East including New England and the states of New York, New Jersey, Pennsylvania with the adjacent parts of Ohio, is the most densely populated region in the U. S. A. This dense population provides both abundant labour and an adequate home market. Here the majority of people are engaged in industry and the average income is relatively high. The New England States were the early seat of many manu-^{Manufactures.}factures. But there has been a spread of manufactures towards West and now the industrial belt of the U. S. A., extends from the New England States, New York, Philadelphia, Baltimore on the East to Chicago, Milwaukee and St. Louis on the West. The manufactures of the U. S. A. may be broadly classified under four heads—(1) those concerned with the elaboration of food products. (2) The manufacture of textiles and articles of clothing. (3) The metallurgical industries including transport materials. (4) Miscellaneous industries.

Food Industries include slaughtering and packing of meat, fruit-preserving, fish-canning, confectionery, dairying and flour-milling. The ranching area in the west and the maize belt has given rise to an enormous trade in preserved meat. The use of cold storage and refrigerator cars has led to the concentration of the meat-packing industry in a

**Food
industries**

small number of cities. Chicago, Kansas city, Omaha, St. Paul, St. Louis and Indianapolis are the important centres. Fruit preserving is important in California. Dairy farming is concentrated along the northern edge of the corn belt. Wisconsin, Minnesota, Iowa, Pennsylvania and New York are the leading butter and cheese manufacturing states. The chief flour-milling centre is Minneapolis ; other centres are New York, Buffalo, Milwaukee, and Kansas city. Manufacture of cocoa, chocolates and confectionery is carried on in the States of New York, Massachusetts, Illinois and Pennsylvania.

**Textile
industries**

The Cotton Industry is the most important of the Textile industries of the U. S. A. This industry was originally established in the New England States, but now they are second in importance to the centres in and around the raw cotton producing belt of the South. The localisation of the cotton industry in the New England States was due to the moist climate, water power and easy access to the cotton plantations of the South and to a large market. But the water power is insufficient for present day needs and New England cotton industry now depends on coal from Novascotia and Appalachian fields. Manchester (New Hampshire) Fall River, and Lowell and New Bedford (Massachusetts) and Providence (Rhode Island) are the leading centres of cotton industry. The abundance of cheap labour and ample supplies of water power have been the chief factors in giving rise to the cotton industry in the Southern region. Coal and raw materials are available locally. The leading centres are Charlottee (N. Carolina), Columbia and Greenville (South Carolina) and Augusta and Atalanta (Georgia). The factories of S. E. States consume more raw cotton than those of New England States. The South exports much of its products which is coarse.

Woollen Goods are manufactured in almost every state in the U. S. A., but the New England States (produce over 60 per cent) and Massachusetts and Pennsylvania are the states mainly concerned, Philadelphia being the great woollen centre.

The principal centres of silk manufacturing are in the states of New York, New Jersey and Pennsylvania. The raw material is imported mainly from China and Japan.

The U. S. A. is the greatest of all **Iron and Steel** manufacturing countries of the world. Pittsburgh, in Pennsylvania, is the leading centre of American iron and steel industry. Best coking coal is found at hand and originally iron-ore also existed here. At present local supply of iron-ore is insufficient and most of the ore is received from the Lake Superior regions *via* the Great Lakes. Along the Lake Erie shore have grown up a large number of iron and steel plants, varying in size and in the nature of their products, in Buffalo, Erie, Cleveland, Lorain, Toledo and also in Detroit. On the level plains that bound Lake Michigan and Lake Erie there is ample room for expansion. Two big iron and steel plants are now located at Gary and South Chicago. Between 1870 and 1943 the production of Steel in the U. S. A. increased from 40,000 to 88,879,000 tons. The significant geographical fact is that about 4/5 ths of this huge output now occur in the Pittsburgh and Great Lake Areas.¹ The presence of coal, iron and lime stone in close proximity has given rise to a successful iron and steel industry in Birmingham in Alabama. The manufacture of machinery is carried on in all the great cities, especially in Philadelphia, Chicago, New York, Pittsburgh, and Gary. Chicago, Buffalo, Detroit, Worcester and Philadelphia make railway plants. Detroit is the largest centre of the automobile industry. Philadelphia, Wellington, Seattle and San Francisco are the leading ship-building centres.

Among the miscellaneous industries paper-making and manufacture of chemicals and drugs are noteworthy. Philadelphia and Holyoke are the centres of paper-making. New York, Philadelphia, Baltimore, Atlanta, Indianapolis and St. Louis are the important chemical manufacturing centres. Philadelphia has the largest leather industry in the world. Richmond (Virginia), Tampa (Florida) and

¹ 2 Smith and Phillips-Industrial and Commercial Geography.

New York are the centres of cigarette manufacturing. New Jersey has pottery works in Trenton. The motion-picture industry is localised in Los Angeles mainly due to the suitable climatic conditions of the Mediterranean region.

**Railways
of the
U. S. A.**

Communication System (a) Railways—Although the Road transportation system is highly developed in the U. S. A., and motor-buses and lorries compete with the railways for carrying goods and passengers for long distances, yet railways retain their importance as the premier means of communication. The Railways of the U. S. A. have a length of about 248,000 miles. The whole of the land is covered with a network of lines especially in the east. From the west of the Appalachians runs the true trans-continental lines of the country to the Pacific sea-board. Through means of communication between east and west is provided by numerous trunk routes. The five main trans-continental lines are :—

(i) The Great Northern—This line runs from Duluth on the west of Lake Superior to Seattle on the Pacific Sea board.

(ii) The Northern Pacific runs from St. Paul to Seattle. These two routes run to the East coast *via* the Hudson-Mohwak valley.

(iii) The Union Pacific Line runs from Omaha to Cheyenne, crosses the Evans pass and thence goes to San Francisco *via* the Sacramento Valley. Branch lines run to Portland on the north and Los Angeles on the south. Connection with the east is made from Omaha *via* Chicago and Pittsburg to New York.

(iv) The Southern Pacific connects New Orleans with San Francisco keeping close to the Mexican border.

(v) The Atchison Topeka and Santa Fe line runs from Kansas City to Santa Fe and thence to San Francisco *via* the lower Californian Valley.

**Panama
Canal.**

(b) Waterways—Of the waterways the Panama Canal, although it does not lie within the borders of the country,

is of vital importance to the U. S. A. It brings the two coasts of the country nearer together by sea. Thus the importance of the trans-continental lines are much reduced, as railway transportation is much more expensive. It also enormously reduces the distance between the eastern ports of America and the ports of Asia. As a short cut between the two great oceans it has doubled up the country's naval power in each.

Within the country itself the St. Lawrence and the Great Lakes (Superior, Huron, Michigan, Erie and Ontario) form an admirable waterway. Besides there are many great rivers which are navigable upto considerable distances. Of these the Mississippi and the Missouri are the most important. The Missouri which joins the Mississippi at St. Paul, is navigable upto the foot of the Rockies. This system provides an important means of communication for central U. S. A. The Ohio, a tributary of the Mississippi, is navigable upto Pittsburg. The great defect of this waterway is that it is subject to seasonal floods. The waterways of the U. S. A. cover nearly 20,000 miles.

Waterways
of the
U. S. A.

Trade and Commerce. The U. S. A. has a large volume of foreign trade. Although raw materials and food-stuffs form the bulk of her exports even now, they no longer are the sole exports. Raw cotton ranks first in value among the commodities exported. Tinned meat, cheese, leather, hides, timber, tobacco, minerals and mineral oil are the other important exports. From the end of the 19th century a remarkable development of the export trade in manufactured articles took place. The principal manufactured goods exported are iron and steel, machinery, motorcars, trucks and spare parts, aircrafts and textiles. Iron and steel goods now rank third in value in the list of exports. Among the imports wood-pulp and paper rank first. They have to be imported from Canada in spite of large home production, because of huge home demand. Other imports are products of tropical and equatorial regions which do not grow in the country. Such imports are rubber, sugar, coffee, tea, silk, tropical fruits, jute, spices, etc. etc. The minerals imported include tin and diamonds. Manufactured goods

Foreign
Trade.

of superior quality and luxury goods are imported from Europe.

The U. S. A., has the greatest trade relations with West Central Europe. The United Kingdom is the best customer followed by France, Norway, Sweden and other countries. Within recent years there has been a remarkable development in the trade with Canada and the South American States. The Foreign trade of the U. S. A., is widely distributed and almost all the civilised countries of the world have trade relations with the states.

MEXICO

Situation and area Mexico lies to the south of the U. S. A., and to the north of Central America with the Pacific to the west and the Gulf of Mexico to the east. It is a fairly large country having an area of 767,000 sq. miles. The population is estimated to be over 25 millions.

Physical features. It is a high plateau (4000 to 8000 ft. high) bordered by the eastern Sierra Madre on the east and the western Sierra Madre on the west, with a narrow coastal strip on either side. The natural regions are :—(a) the western deserts including lower California, (b) the temperate hill slopes, (c) the Gulf coast, (d) the western plateau divided into hot zone, temperate zone and cold zone respectively.

Climate. Broadly speaking, the climate is tropical along the coast, temperate on the plateau and cold on the lofty mountains. The northern portion is semi-desert and even the north-eastern coastal strip is a dry scrubland. The S. E. coastal plain is hot but receives a heavy summer rainfall (30"—60"). Most of the rain falls on the outer slopes. There is a great range of temperature between summer and winter.

Agriculture.—The Gulf coastlands, as a result of the tropical climate, produce sugarcane, rubber, tobacco, cocoa, hemp, cocoanuts etc. In the temperate hill slopes cotton, wheat, maize and coffee are grown. Sheep and cattle are also reared. The high plateau (over 6000 ft.) is

deficient in rainfall and the conditions are not favourable for cultivation. However cotton, wheat and maize are grown with the aid of irrigation. The west and north-west are economically unimportant as they are semi-deserts. Some sheep are reared here.

Minerals.—The country is rich in minerals, and more than 66 per cent. of all the exports are minerals. Mexico is the leading silver producing country in the world (nearly 40 per cent of the world's total). The chief mining districts occur in the plateau region. The principal silver mines are in the states of Durango and Chihuahua in the north and of Hidalgo in the south. The position of Mexico as a producer of gold has improved in recent times. Copper is widely distributed. It occurs mainly in the states of Sonora and Coahuila. Iron is said to be very abundant in Mexico and it is mined in various places. The deposits of northern Coahuila and of the State of Durango are the most important. A few years ago, Mexico ranked next to the U. S. A., in the production of mineral oil, but in recent years the production has dropped considerably. The important producing regions are the state of Vera Cruz, west and south of Tampico and on the northern part of the isthmus of Tehuantepec. The coal production of Mexico is not even sufficient to meet the home demand. The other important mineral products are lead and zinc Minerals.

Manufacturing Industries are not yet much developed. This backwardness is due to want of capital and skilled labour, undeveloped state of communication system and frequent political disturbances. Cotton industry is the most advanced at present. Iron foundries and steel works have been established at Monterey and Chihuahua. Woollen mills, sugar mills, potteries, tobacco factories also are in operation but usually on a small scale. Manufac-
tures.

Trade, Routes and Towns.—The railway system of Mexico is developing rapidly with state aid. It has now over 18,000 miles of rail road. All the inland towns are connected by means of railways to the ports. The ports are also linked up with the U. S. A. railway system. The

Trade.

chief ports are **Vera Cruz** and Tampico on the Gulf of Mexico. The chief exports are minerals—*mineral oil, silver, lead, zinc, and copper*, to name only the principal ones. Other items of export consist chiefly of agricultural products, such as *cotton and coffee* and some *bananas*. In return the country imports manufactured goods and food-stuffs. About 90 p.c. of the export trade is with the U. S. A. **Mexico** is the capital and principal city of the republic.

CENTRAL AMERICA

The Central American Republics include **Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, and Panama**. These are small states, economically of little importance, and largely undeveloped owing to frequent revolutions.

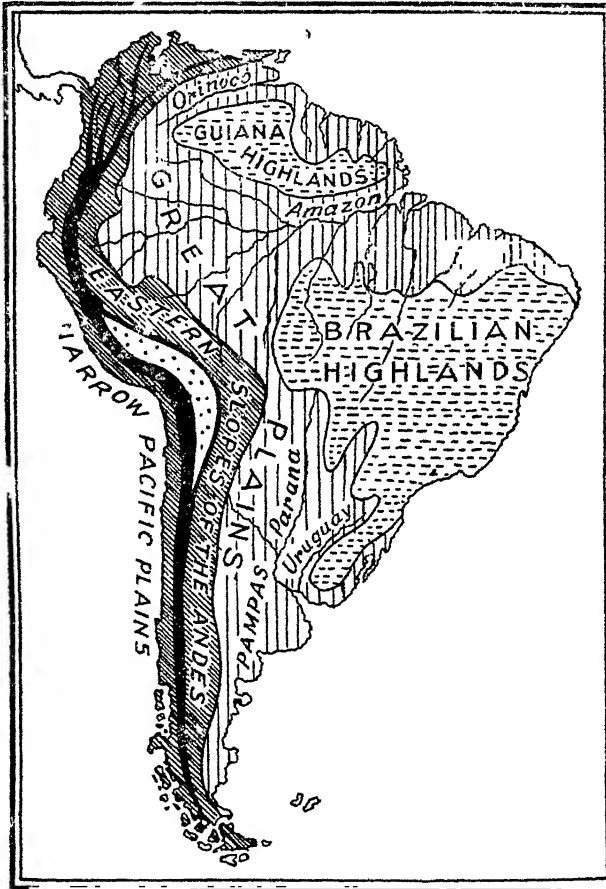
Of the numerous islands of the **WEST INDIES** only three are important—**Cuba, Porto Rico, and Haiti**. Cuba has a large output of *sugar and tobacco*, and being in alliance with the U. S. A., exports most of its products to that country.

QUESTIONS

1. Examine and estimate the coal and petroleum resources of the U.S.A.
2. Examine the present position of the iron and steel industry of the U. S. A.
3. "Though possessing practically all advantages for the development of industries, Canada is mainly an agricultural country." Why?
4. Locate the chief mineral and industrial regions of North America.
5. What are the chief agricultural products of the U.S.A., and where are they produced?
6. What are the chief mineral products of the U.S.A., and from where are they obtained?
7. Write a short essay on the situation of the chief coal-fields and the chief manufacturing areas of the U.S.A.
8. To what natural conditions would you ascribe the export of tobacco from the U.S.A.
9. Describe the mineral resources of Mexico and discuss the chances of their full development.
10. Discuss the position of Canada as (a) an agricultural country, b) as a producer of minerals. "Canada is the making of railways"—Discuss.

SOUTH AMERICA

Position and Size.—The continent of South America has an area of some 7 million sq. miles. Its position is best defined by three lines of latitude and one line of longitude : Area.



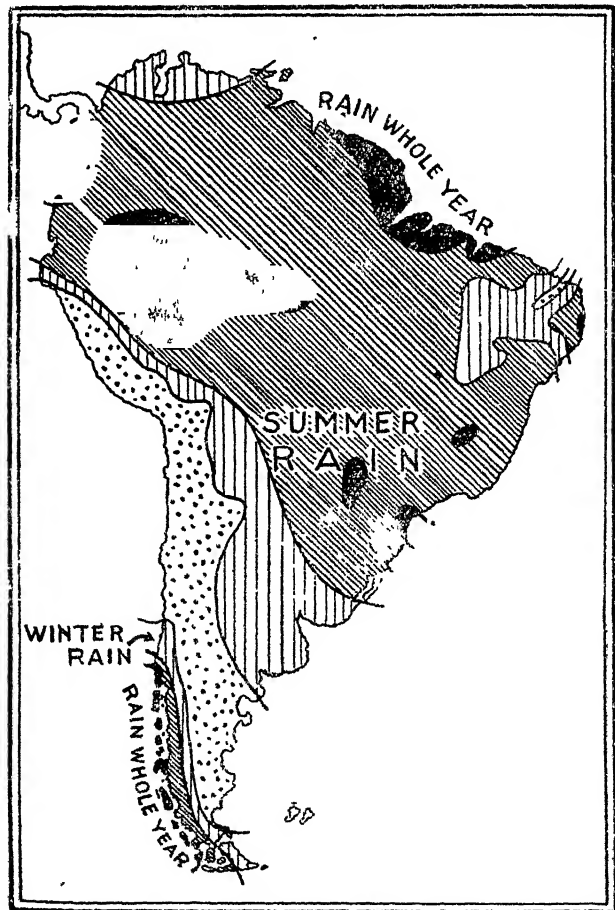
The Principal Physical Features of South America.

the Equator passes through the mouth of the great River Amazon ; the Tropic of Capricorn cuts through the middle of the continent ; the latitude of 50°S. passes a few degrees north of Cape Forward, the most southerly point of the mainland ; the central meridian of the continent is formed by the longitude of 60°W. It is not always realized, however,

that the South American continent does not lie exactly south of North America,—it is to the south-east of the latter. It is a wedge-shaped land mass, tapering towards the south ; more than two-thirds of the continent, therefore, lie within the tropics. But for the narrow Isthmus of Panama, which connects it with the North American continent, South America would be the largest island in the world : the Isthmus has, however, been actually cut through by the Panama canal.

Position.

Physical Features and Geology.—The continent of



A general rainfall map of South America.

South America falls into three broad physical units :

(a) **The Andean System** of the west lies, like the Rocky ^{Andean} Mountain System of North America, close to the Pacific ^{System.} coast.

The Andes are a fold mountain system enclosing a number of plateaus in the middle, but narrowing into one main range in the south ; in the north the main range is broader, and ultimately it branches out into at least four important subsidiary ranges and one lesser range passing into the Isthmus of Panama. An extremely narrow coastal plain flanks the Andean System on the west. Valuable deposits of silver, copper, tin and other metals occur, especially in the high plateau of Bolivia. There are important oilfields in Venezuela, Peru and Argentina.

(b) **The Central Plains** lie immediately east of the eastern slopes of the Andes, and consist of at least four major divisions ; in ^{Central Plains.} the north is the Basin of the Orinoco River ; then there is the great Basin of the Amazon ; farther south lies the Basin of the Parana-Paraguay Rivers ; and in the south are the Argentine Pampas and the Patagonian Plateau (desert).

(c) **The Eastern Highlands** consist of two great blocks—the Guiana Plateau in the north and the Brazilian Plateau in the south. These consist of ancient rocks and are ^{Eastern Highlands.} associated with minerals like *gold, diamonds, iron ore, manganese*, etc.

Climate and Vegetation—Only the southern third of the continent lies in the S Temperate Zone, by far the ^{Wind} greater part being tropical. The northern two-thirds is ^{Systems.} under the influence of the Trade Winds—the N. E. and the S. E. Trades ; and the southern third only lies in the N. W. Anti-Trades Belt (North Westerlies). In the north-west ^{North-west coast.} of the Pacific coast the rainfall is governed mainly by Monsoon Winds in summer, and the region is covered by dense evergreen forests. The climate being hot and humid and owing to the nearness of the sea, it is possible here to cultivate such crops as cocoa and sugar-cane. The rainfall is progressively less and less towards the south till, at last, one reaches the long and extensive desert region in the centre of the Pacific coast. This actually is the Chilean Desert, regarded so important economically for its huge deposits of

nitrate and allied minerals. South of the Desert of Chile the belts of the Trade Winds and Anti-Trade Winds meet, and it is here that we find the Mediterranean region of South America—in the neighbourhood of Valparaiso and Santiago. Obviously it is a region of Mediterranean fruits and wine. South of this lies the cool temperate region traversed by the Westerlies. The rainfall is more or less uniformly distributed all the year round, and the natural vegetation is deciduous forest. But the region lies undeveloped for various reasons. It is similarly possible to subdivide the Andean Chain into a number of climatic areas : portions of the Northern Andes lie in the belt of the N. E. Trades, and have copious rainfall. Here lies the fertile valleys of the Cauca and the Magdalena, with their tropical products ; higher up the slopes grow such sub-tropical products as coffee ; and it is sometimes possible to cultivate temperate crops on the mountain ridges. The Central Andes also lie in the Trade Winds Belt—partly in that of the N. E. Trades and partly in that of the S. E. Trades. The mountain chains have enclosed a plateau rich in certain minerals. There are poor pastures here, and the facilities for cultivation are limited. Southern Andes are essentially a divide between the east and west, beyond the S. E. Trade Winds Belt. The mountain chains, on the other hand, cut off the N. W. Anti-Trades from blowing east into Patagonia. The Central Plains fall into four climatic sub-divisions : in the north is the Orinoco Basin lying on the right flank of the N. E. Trades. It is a large grassy plain, often called the Llanos. It is rather an undeveloped region yet. Then there is the vast Amazon Basin, the largest region of equatorial forests or the *Selvas* in the world. The whole of it lies in the N. E. Trades Belt, and enjoys heavy showers all the year round. The Amazon Basin is the original home of the rubber tree. Enormous tracts of the Amazon Basin are liable to floods, and the region still lies the little developed. The Basin of the Parana-Paraguay lies partly in the belt of the S. E. Trades ; it is, on the whole, a temperate region, covered in the north by warm temperate forests and in the south by grasslands or *Pampas*, as they are called. The grasses have now largely yielded

Andean
Chain.

Central
Plains.

place to crops, especially in the Argentine Republic. South of the *Pampas* lies the dry, cool, temperate Desert of Patagonia. It is in the rain-shadow of the Southern Andes, and very sparsely inhabited. A few sheep are, however, kept here by the local inhabitants. The Eastern Highlands fall into two climatic sub-divisions : the highlands of Guiana and Venezuela lie in the N. E. Trade Wind Belt, and are covered partly by the *Selvas* or *Montana* (equatorial forests) and partly by savana or grassland. The Brazilian High-

Eastern
High-lands.



The Principal Natural Regions of South America.

lands are partly in the N. E. Trades Belt, and partly in the rain-shadow of the edge of the plateau itself, which prevents the S. E. Trades from blowing inland ; the south-eastern coastlands, however, are under the influence of the S. E. Trades. The vegetation, therefore, differs from dense equatorial forests to scrub. There are warm temperate forests in the south, where the soil is of volcanic origin and consequently rich. And this is naturally the best developed part of Brazil with its enormous production of coffee.

THE SOUTH AMERICAN STATES

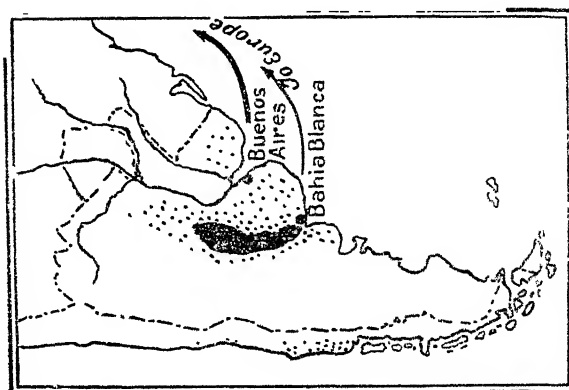
Amazon
Basin.

Brazilian
Highlands

BRAZIL is the largest state of South America, with an area of $3\frac{1}{4}$ million sq. miles. The total population in 1950 was over 52 millions including 600,000 Indians. It falls into three broad divisions : (a) *The Amazon Basin*, as already noted, is the largest equatorial region in the world, but little developed as yet. The only product of note obtained from this region is *Para rubber* ; but the production has diminished considerably owing to extensive exploitation in the past. The Amazon, with its numerous tributaries, affords practically the only means of communication with the interior. The river is navigable by ocean-going vessels of 10,000 tonnage up to a thousand miles from its mouth. **Manaos** is the collecting centre for rubber from the forests, and ocean-going vessels ply between this collecting centre and the port of **Para** at the mouth of the Amazon. (b) *The Brazilian Highlands* are believed to be rich in minerals, but the output at present is quite small. The bulk of world's *Monazite* comes from Bahia and other parts of Brazil. The production of *diamond* is now not very important. Large reserves of high grade *iron ore* lie in the state of Minas Geraes. There are rich reserves of *Manganese ore*. *Gold* is also mined. The coastal tracts, extending from the port of Para to **Sao Paulo**, are, however, fairly developed. The climatic conditions over this long but narrow sub-region are naturally rather varied ; in the north the climate is equatorial, in the south tropical ; but everywhere it is tempered by oceanic influences. A corresponding variation in the products is also obvious :

the chief crops of the north are *cotton, sugar-cane, rubber, cocoa, maize, and manioc*; those of the south are *coffee and cotton*. Half the world's total coffee is produced in the region around Sao Paulo. (c) *The Parana-Paraguay Basin* occupies the southern portion of Brazil, which adjoins the territory of Uruguay. The chief product is *maté* tea; and this is the great *cattle-farming* area of Brazil. The capital and chief port of the republic is **Rio de Janeiro**. Farther south lies **Santos**, the chief coffee port. **Pernambuco** and **Bahia** or **San Salvador** are the ports of the northern part of the coastland along the Brazilian Highlands. **Rio Grande do Sul, Pelotas, and Porto Alegre** are minor ports along the coast of the Parana-Paraguay Basin; all these are accessible by vessels of small draught because of a bar at their entrance. The main line of inland communication is the great Amazon system; but most of the ports are connected by rail with the centres of production near by. The principal system of railways, however, is around Sao Paulo; there is thus direct railway communication between Sao Paulo, Rio de Janeiro, and Santos, and the system is linked with that of Uruguay. The inhabitants of Brazil are mainly of Portuguese descent, but there are large numbers of immigrants chiefly from Italy, Spain, Germany, Austria, and Russia. The native Red Indians are in hopeless minority. The principal items of export are *coffee, sugar, cotton, leather, cocoa, meat, and rubber*. And the imports consist mainly of *machinery, iron and steel, wheat, cotton goods, petroleum and coal*. The bulk of the foreign trade is with the U. S. A., and U. K.

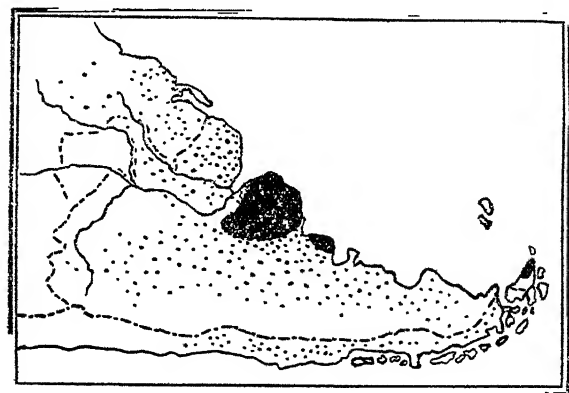
ARGENTINA is said to be the most progressive state of South America. It has an area of about 1,150,000 sq. miles with a population of 16 millions. It occupies the greater part of the south, and has large tracts suitable alike in soil and climate for wheat. In the north it includes a part of the Parana-Paraguay Basin, covered largely by Tropical Forests, (Chaco low-lands) and not yet much developed, the only products being *maté* and *tannin*. Then there is the rich grassland region, centred mainly on the La Plata River, the main estuary of



The Wheatlands of the Argentine and South America.



The Cattielands of South America.



The Sheeplands of South America.

the Parana-Paraguay, with a rather varied type of climate ; the warmer and damper north-eastern parts of this region are suitable for *maize* and *flax*, the more temperate south-eastern parts eminently suited to *wheat* ; this is also the principal *cattle-farming* and *sheep-rearing* region of South America ; and Argentina, besides being one of the great ^{Grass-land} granaries of the world, is also one of the principal exporters ^{Region.} of meat to the great industrial countries of Europe. Lying between the grassland region and the Andes there is, again, a small area adjoining the Mediterranean lands of South ^{Mediterranean} America, and it serves as the *fruit* farming and *wine* pro- ^{Region.} ducing region of the republic ; some *sugar*, *cotton*, *tobacco*, and *hemp* are also produced in this warm sheltered region. South of the grassland, however, stretches the cool temperate desert of Patagonia, once believed to be of little economic value. But on the comparatively grassy slopes of the Andes there are rough sheep *pastures* ; and what is more important, small *oilfields* have recently been discovered in the desert tracts including the Andean chain. It is found around Rivadaria on the coast of Patagonia mainly. The total output amounts to 15 million barrels. The capital and chief port is **Buenos Aires** on the River Plate ; it lies in the region of the wheatlands of the ^{Towns} Republic. Other ports of this region are **La Plata**, **Rosario**, and **Bahia Blanca**, all of which, including Buenos Aires, have been provided with artificial harbours. **Tucuman** is the seat of the sugar industry, and **Mendoza** of wine ^{Communi-} industry. The Argentine is rather well served by railways. ^{cations.} The Chil -Argentine Railway connects Buenos Aires with Valparaiso (Chil ), and a great network of railways join all the inland centres of production with the leading ports. Moreover, the Parana and Paraguay are—or have been made—navigable through Argentina to the state of Paraguay. The population of Argentina is 16 millions, ^{Population.} consisting mainly of the descendants of the early Spanish settlers ; but in recent years there has been a large influx of immigrants chiefly from Italy. The native Red Indians are as usual in hopeless minority, and they live chiefly in the northern tropical forests. The principal items of export are *wheat*, *maize*, *beef*, *linseed*, *hides* and *skins*, *butter*,

Foreign
Trade.

mutton, and *wool*. The foreign trade of the Republic has been showing a steady increase in value since the closing decades of the last century ; the export trade has expanded nearly four times during the last three decades or so, the import trade has multiplied nearly five times. But all through this long period the balance sheet has never recorded an adverse trend,—there has always been an excess in the value of exports over imports.

Products,
etc.

PARAGUAY lies mainly between the Parana and Paraguay Rivers. It is quite a small republic north of the Argentine, and occupies a part of the tropical forests of that republic as well as a small stretch of grassland on the east of the Brazilian Plateau. The area is 161,000 sq. miles and population little over 1 million. Most of the country consists of a series of plateaus covered with grassy plains and dense forest in the east. The chief exports are *tobacco*, *maté* (Paraguay tea), *oranges*, *timber*, and *skins*. Timber, however, is the chief commercial product, and *cotton* has made a good beginning. The capital is **Asuncion**, on the Paraguay River ; it is accessible to small ocean-going vessels. The state is still very undeveloped and sparsely peopled, and the population consists mainly of Red Indians and half-castes of Spanish descent. There is railway communication between Asuncion and Buenos Aires (Argentina).

Products,
etc.

URUGUAY is another small republic occupying an area of 72,150 sq. miles ; it lies between the La Plata estuary and Brazil. In general character it resembles the rich grasslands of the Argentine. The principal products are *maize* and *wheat* ; some *linseed* is also grown ; and large areas are devoted to *cattle farming*. The chief items of export are *wool*, *meat*, and *hides and skins* ; *wheat and flour* and *linseed* also enter into the export trade. The country has been rapidly developed, and the balance of the foreign trade is in favour of the republic. The capital and chief port is **Monte Video**, which has a finer harbour than Buenos Aires (Argentina), and the harbour has been considerably improved. Fray Bentos and Paysandu are

meat-packing towns on the Uruguay. There are railways linking Monte Video with the meat-packing centres.

CHILE occupies a long narrow portion of territory on the west of the Andean Chain. The republic has an area of 290,000 sq. miles and a population of 5,930,000. It readily falls into three well-defined regions: (a) *The Northern Desert* (Atacama Desert) is economically valuable for various minerals, especially *nitrates, copper, silver, and gold*. (b) *Mediterranean Region* occupies the heart of the country. The chief products of this region are *wheat, barley, and various fruits, and also wine*. Large tracts are devoted to *cattle and sheep*. (c) *The Forest Region* of the south is essentially a *dairy farming* and pastoral country. But the region is very sparsely populated owing to extremely heavy precipitation and the lack of suitable land for settlement. It is interesting to learn that it is only in the region of Chile in the whole of South America that a small *coal-field* has been discovered. The capital is **Santiago**, and its port is **Valparaiso**; both of them are in the Mediterranean region of Chile. Valparaiso is the main port of imports. **Iquique** and **Antofagasta**, both in the Desert Region, are the leading ports for export, the bulk of which naturally consists of nitrate and guano. *Nitrate of soda and copper* are the principal articles of export, while nearly 67 per cent. of the imports consists of various manufactures. The balance of the foreign trade is in favour of the country.

BOLIVIA is a large but rather undeveloped inland state. Its western region is remarkable for the elevation of the Plateau of Titicaca, comparable only to that of Tibet. It is rich in minerals, especially *tin, copper, and silver*. Bolivia is said to contribute nearly a quarter of the world's total output of tin, and the wealth of the country comes almost solely from its minerals. The eastern region gradually slopes down to the Amazon Basin, and has the same type of vegetation on the whole. The population is about 3 millions, nearly two-thirds of which consists of Red Indians. The capital is **La Paz**, situated in the plateau region near Lake Titicaca. But **Sucre** on the east is the

Communi-
cations

legal capital. Bolivia has no port and no coast-line. But La Paz has direct railway communication with the port of Arica (Chilé) ; this is the shortest sea-connection, although the minerals are sometimes exported also through the Chilean port of Antofagasta or the Peruvian port of Mollendo. The natural outlet of the eastern region of Bolivia is through Brazil by river or through Argentina by railway. Beyond the Andes, however, there is a large tract of territory in the Gran Chaco, for the possession of which Bolivia and Paraguay waged a long but indecisive war from 1932 to 1936, because the region is believed to be rich in oil.

Natural
regions
and
products

PERU lies north of Chile, and falls into three divisions : (a) *The arid coastal region* where cotton and sugar-canes are grown on tracts irrigated by the waters of the Andean rivers ; (b) *The Sierra*, an agglomeration of valleys and tablelands enclosed by the Andes, where the only crop is *quinoa*, a native cereal, if occasional barley and other crops be left out of consideration ; (c) *The Montana* on the eastern slopes of the Andes, where the only notable product is *rubber*. But the Andean region is rich in minerals, especially *copper* and *silver* ; some *oil* is also obtained from the northern part of the coastal strip and here we find the llama and the alpaca yielding valuable *wool*, and the llama also serving as a transport animal. The capital of the republic is **Lima**, and its port is **Callao**. **Mollendo**, though in Peru, serves mainly as the port for Bolivia. The principal items of export are *sugar, petroleum, metals and ores, llama, vicuna and wool*.

Towns.

Regions
and
Resources

ECUADOR is a small country north of Peru, and lies across the Equator ; hence the name of the country. The country falls into two broad divisions : (a) *a coastal strip* producing *cocoa* as the chief commercial product ; and (b) *the Andean plateau* which covers the greater part of the country. Another important product is *mineral oil*. The capital is **Quito**, almost on the Equator, but being on a height of 9,000 feet, it is the abode of perpetual spring. The principal port is **Guayaquil**.

COLOMBIA lies north of Ecuador, at the northern end of the principal chain of the Andes. The coastal plains and the main valleys lie between the Andean Chains. The most notable of the valleys are those of the Cauca and Magdalena. The climate is equatorial, and the chief products are *cocoa*, *sugar*, *cotton*, and *bananas*. On the slopes of the mountain spurs grow *coffee* and *maize*; on higher elevations, *wheat*. The mountainous tracts are rich in minerals, including *gold* and *silver*; and important *oilfields* have recently been discovered near the coast. The capital is **Bogota**, and the leading ports are **Cartagena** and **Baranquilla**. **Medellin** is a large mining centre on the Andes. The Magdalena and Cauca serve as the main highways.

Regions
and
Resources.

Towns.

VENEZUELA lies north-east of Colombia, and consists of a number of natural regions : (a) *The Coastal Plains* of the north are important for *cocoa* and *sugar*, and the recently discovered *oilfields* around the shallow gulf of Maracaibo. (b) *The Coastal Range*, actually an offshoot of the Andes, where the chief products are *coffee* and *maize*. (c) *The Llanos* or grassy plains of the Orinoco Basin is a region sparsely peopled but largely devoted to *cattle* and *horses*. (d) *The Guina Highlands* are still in an undeveloped stage. The capital of the republic is **Caracas**, and its port is **La Guayra**. There is railway connection between the two. **Valencia** is another inland town, and its port is **Puerto Cabello**; these two are also connected by rail. With the increase in the output of *oil* the country has been developing rather rapidly; about 75 per cent of the total export has consisted of oil since 1926; prior to that *coffee* was the leading export. The foreign trade has been showing a progressively favourable balance since 1923.

Regions
and
Resources.

Towns.

THE GUIANAS lie east of Venezuela. The region is believed to be rich in minerals especially *gold* and *diamonds*, but the output at present is small, and the whole region still lies in an undeveloped state. It is divided into a region of lowlands and a region of plateau. The

Regions
and
Resources.

Divisions.

minerals are from the plateau regions, while the agricultural products such as *sugar*, *rice* and *cocoa* are the products of the lowland regions. The capital of British Guiana is **Georgetown**; that of French Guiana, **Cayenne**; and **Paramaribo** is the capital of Dutch Guiana or Surinam.

TRINIDAD is a small island off the mouth of the Orinoco River. It is a British possession, and the largest producer of *petroleum* in the British Empire. There is the famous pitch lake, from which *pitch* or asphalt is obtained for road making.

THE FALKLAND ISLANDS, to the east of the Straits of Magellan, also belong to Great Britain. The climate is damp and foggy, and the rearing of sheep and cattle forms the chief occupation of the people. The island of South Georgia is an important whaling base.

QUESTIONS

1. What are the main sources of exportable commodities in Chile, Argentina, and Brazil? 'The main exports of these countries show contrasts largely dependent on climatic differences in the three areas.'—Elucidate this statement.
2. Give a general description of the Amazon Basin. What possibilities of commercial development the region may have?
3. Give an account of the foreign trade of South America.
4. Discuss the nature of trade between India on one side and South American states of Brazil, Argentina, and Chile on the other. In what way do you expect this trade to be modified in the near future?
5. Give an account of the economic geography of Argentina and Brazil.

CHAPTER III

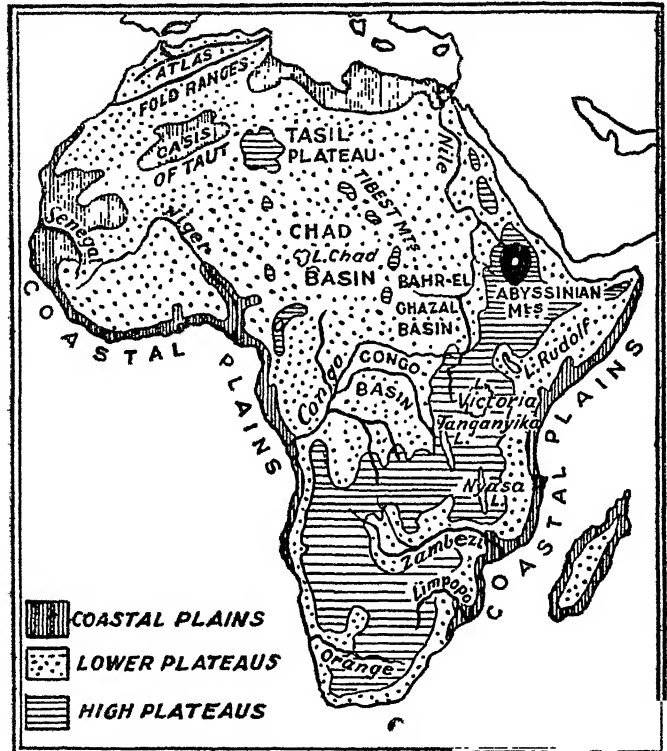
AFRICA

The Dark Continent

Position and Size.—Africa, with a total area of some 11,000,000 sq. miles, is next to Asia in size. By far the greater part of it lies within the Torrid Zone for the **Equator** cuts it almost in half, and both the **Tropics** pass over the mainland. Its central meridian is longitude 20°E. For its size, however, it has quite a short coast-line—only about 19,000 miles long.

Physical Features.—In its general build, Africa resembles the small continent of Australia. With the exception of the small chains of the **Atlas Mountains** in the north-west, the whole of this vast continent is formed by a **plateau**, surrounded at intervals by narrow **coastal plains**. The Atlas, we have already seen, is a series of fold mountains belonging to the Alpine System of Europe, or, from a broader perspective, it is a part of the great Alps-Himalayan System of Eurasia. And indeed from a meteorological point of view, too, the northern fringes of Africa belong to the great land mass of Eurasia. The higher elevation of the plateau is in the south as it is in Peninsular India and the lower elevation in the north. Actually, however, it is not a single plateau, but a series of plateaus of varying elevation. The **Plateau of South Africa** reaches as far north as the upper and lower course of the River Congo, which, in its middle course, makes a long detour towards the north. The South Africa Plateau then sends out various branches over the lower plateau in the north. In the north-east are the **Abyssinian Mountains**, from which, as from mountain knot, are given off a number of folded mountains (not Alpine chains) towards the south. The **Drakensberg** Mountains, actually the highest edge of the southern plateau, lie south-east.

Climate.—Africa is the only continent cut in half by the Equator. So when it is summer in North Africa it is winter in the south, and *vice-versa*. During the northern summer (May-Oct.) the Sahara Region gets very hot owing to the movement of the sun towards the Tropic of Cancer,

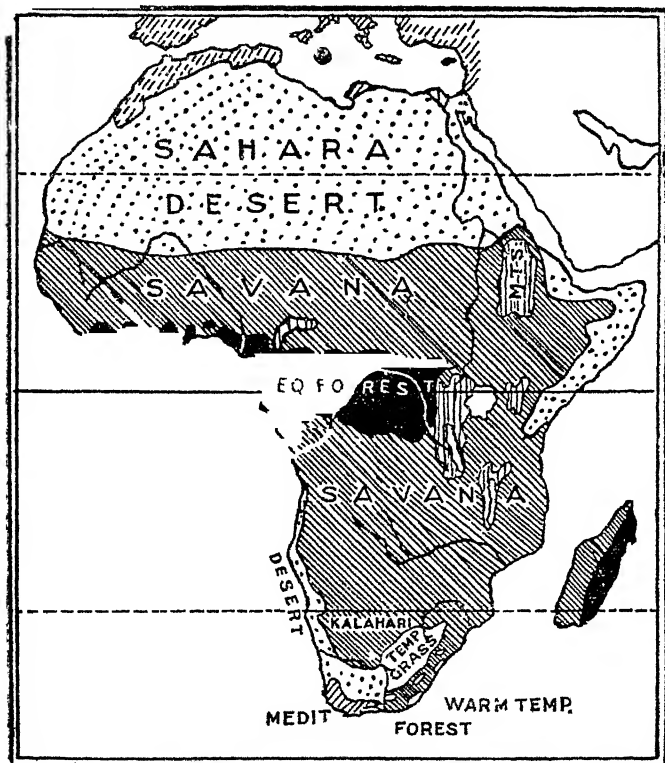


The Physical Features of Africa.

Wind
Systems
and
Rainfall.

and North Africa lies under the N. E. Trade Wind Belt. As these winds blow mainly from a land surface they can bring no rain. But owing to the northerly swing of the world's wind systems, the S. E. Trade Winds shift northward, and the south-west extremity of the continent, where it is then winter, receives its share of moisture from the N. W. Anti-Trades. And owing to the severe heat over the Sahara region the hot air rises and draws in a deflected branch of the S. E. Trades across the sea so as to cause

heavy showers all over Central Africa. This deflected branch of the S. E. Trade Winds may as well be described as monsoon winds. During the southern summer (Nov-April) the wind systems swing southward, so that the S. E. Trades cover the whole of South Africa and bring in heavy



The Natural Vegetation of Africa.

showers ; but the south-west extremity falls in the rain-shadow of the eastern mountains. At this season the N. E. Trades shift farther south in North Africa, where it is still very dry ; but the north-west extremity comes under the influence of the rain-bearing S. W. Anti-Trades. Central Africa, however, is a region of rainfall all the year round, and as is only natural for all Equatorial regions it, too, is a land mass of convectional rains.

Natural Vegetation.—These climatic conditions are beautifully reflected in the natural vegetation of the continent : (a) *Equatorial Forests* occupy the Congo Basin and the Guinea Coast where it is always 'hot and wet.' (b) *Tropical Grasslands or Savanas*, with rain in summer and drought in winter, cover both sides of the Equator as far north as the Kalahari Desert. (c) *Deserts* cover enormous tracts in Africa and occur on the border of the Savanas. (d) *Mediterranean Vegetation* likewise occurs on the borders of the deserts in the north as well as in the south. (e) *Warm Temperate Forests* are found only in the south-east. (f) *Temperate Grassland*, known as the veld, covers the south-eastern part of the high Plateau of South Africa. (g) *Mountain Vegetation* occurs in the Abyssinian Mountains.

THE ATLAS REGION

General considerations. **The Barbary States** occupy the north-west of Africa. Along this region run the mountain chains of the Atlas ; and each of the three states is divisible into three parts—(a) *The Coastal Plains* ; (b) *The plateau bounded by the principal chains of the Atlas* ; and (c) *The Plateau of the Sahara*. The climate is Mediterranean throughout.

Products. **MOROCCO** is the westernmost state of the three. It is a Sultnate under French protection. The chief agricultural products of the fertile coastal plains are *barley, wheat, maize*, and various *fruits* such as olives, oranges, vines, figs, etc. *Date-palms* are grown in the oases of the Sahara region ; and the chief forest products obtained from the plateau enclosed by the Atlas chains are *cork* and *cedar*. In this plateau region sheep are reared, and there are numerous cattle in the plains. The capital is **Marrakesh** or **Morocco**; but the chief town and port is **Casablanca**. Fez is an important inland trade centre. The exports consist chiefly of *eggs, wheat, barley, almonds, wool, linseed*, and *fez cap* and *leather*. The trade is chiefly with France and Britain, but fez caps and leather go mainly to other parts of Africa. The imports, however, exceed the exports by more than double the value.

Trade.

A small area of Morocco, including the port of **Ceuta**, however, belongs to Spain.

ALGERIA is a French Colony. Its products are similar to those of Morocco, and it has important *fisheries* ^{Products.} along the coast. Mining is important, especially of *iron ore* and phosphate. The principal towns are **Algiers**, the capital and **Oran**—both ports. The chief items of export ^{Trade.} are *wine, sheep, wheat, tobacco, and minerals*. The trade is mainly with France.

TUNIS is also a French Protectorate. Its capital is **Tunis**. Agriculture is the predominant industry but minerals including iron ore and phosphates are also found.

For the development of this region the French have built a number of railways, which connect nearly all the important towns such as Casablanca, Fez, Oran, Algiers, and Tunis, and at the same time penetrate into some of the oases of the Sahara. <sup>Communi-
cations.</sup>

THE NILE BASIN

THE SUDAN lies between Egypt and Uganda. The area is roughly about 1 million sq. miles and the population is about 8 millions. It, too, is a 'gift of the Nile,' though in a somewhat modified sense ; the rainfall is low, and but for the waters of the Nile the whole tract, covering as it does an area of more than 1,000,000 sq. miles, would be a desert. Large stretches of land have been irrigated, especially since the construction of the *Sennar Dam* in 1925. The climate is suitable for a great variety of crops, especially *cotton*, and the soil has also been made suitable for them. Large tracts are now actually under cotton. In clearings in the southern forest regions *Coffee, Sisal* <sup>Character-
istics.</sup> *Products.* *hemp and Maize* are grown. In the grasslands cattle, sheep, mules and camels are reared. Millet, Tobacco and Ground-nuts are also grown. Dates are plentiful. The Sudan is the chief source of the world's supply of gum arabic, which is an important item of export from the country. A small

Trade.

amount of *gold* is worked in the Red sea hills. The principal town is **Khartoum**, and the chief port is **Port Sudan**. There is railway connection between the two. The principal exports are *cotton, gum and millet*. The principal imports are *machinery, sugar, tea, petroleum, wheat and wheat flour, vehicles*, etc. The bulk of the trade is with Britain.

Natural Regions.

EGYPT is an independent sovereign state. It, too, is a vast country with a total area of 383,000 sq. miles ; but the habitable territory of the country is no more than only 12,000 sq. miles in area. The population is 19,200,000. Long, long ago, Herodotus called it 'the Gift of the Nile.' Leaving the great desert waste, we may divide Egypt into two natural divisions : (a) *Upper Egypt* and (b) *Lower Egypt*. Upper Egypt is actually coincident with the Nile Valley, and Lower Egypt with the *Nile Delta*.

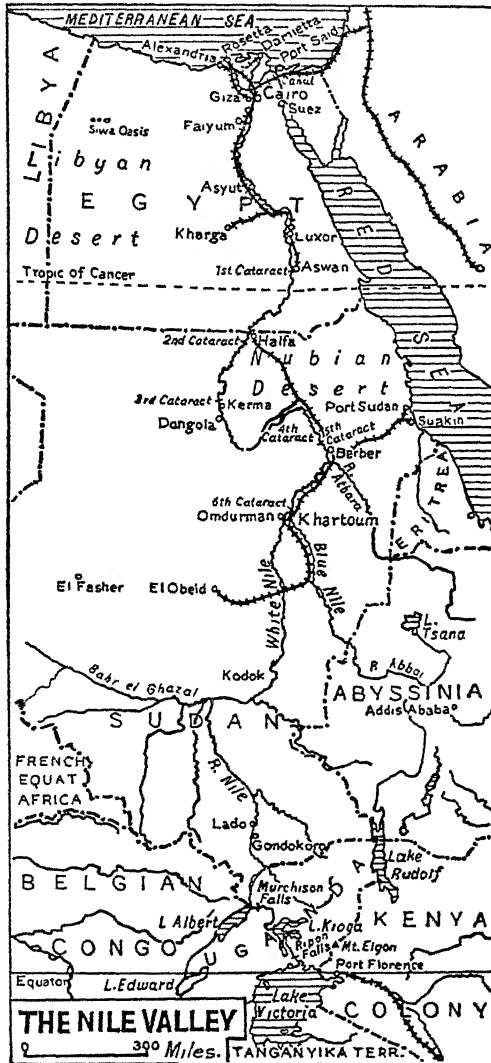
**Egypt—
"the gift of
the Nile".**

The habitable area of Egypt is limited to the tracts that are capable of being irrigated by the waters of the Nile. The annual rise of the water in the Nile keeps alive the agriculture of Egypt. The river begins to rise by the end of June and by the end of September reaches the top of the banks and begins to overflow except where restrained by artificial dykes. In upper Egypt the river on rising is allowed to fill large closed basins, the water being run off again by sluices at the end of about seventy days. The defect of this method is that the ground remains unproductive for half the year. In the lower and middle Egypt perennial irrigation is practised. High embankments are raised to confine the river in flood and high-banked canals conduct the water into the irrigation basins. Valuable crops that require a longer period to mature are grown here. But for the Nile, Egypt would have been a vast tract of barren, sandy land devoid of human habitation. Even now, if the rise of the Nile is too high or low, famine breaks out in a greater or lesser degree.

The length of the Nile measured from its source is about 4,060 miles. It draws water from two main sources ; first the Equatorial Plateau, where the reservoirs are Lakes Victoria, Albert and Edward ; secondly S. W. Abyssinia.

where the Blue Nile (Bahr-el-Azrak) and Atbara are the most important affluents. The river enters Egypt at Wadi Halfa. The autumn floods of Egypt are due almost entirely to the contribution of the Blue Nile. The Delta is a monotonous plain with its greatest width—150 miles—between Alexandria and Port Said and extends 100 miles from North to South.

The Valley has a desert type of climate, with extreme ranges of temperature both diurnal and seasonal. Hot, dry and dust-laden wind



Climate.

(Khamsin) blows outwards from the desert area towards the sea. The Delta enjoys a Mediterranean type of climate and has some rain in winter.

Agriculture.

Egypt is a country of small land-owning agriculturists. Normally, the agricultural year is divided into three seasons, winter, summer and "Nili" (the period of Nile flood). In the delta region it is possible to grow crops all the year round by means of irrigation. *Cotton* and *sugarcane* are the summer crops. *Rice* and *Maize* are cultivated in the "Nili" period. *Wheat*, *beans* and *clover* are the usual winter crops. In the oases of the desert areas, the only product is *dates*. Cotton is by far the most important crop and the only "cash" crop of Egypt. Some *tobacco* is also grown and cigarettes are manufactured. Weaving of cotton goods is carried on for supplying local needs. The bulk of the cotton crop is exported.

Minerals.

Egypt is poor in mineral products. *Manganese* is mined in the Sinai peninsula. A little *oil* has been found in the Red Sea area. *Phosphates* are obtained from Isua and Kosseir.

Trade and Trade routes.

Egypt cannot grow enough food for her big population and imports food-stuffs as well as wood, coal, textiles and iron and steel manufactures. The principal exports are cotton and tobacco. Raw cotton forms nearly nine-tenths of the exports of Egypt. Cotton seeds are also exported. About 50 per cent. of the trade is with Great Britain.

Communications.

The Nile is very important as a waterway. It is navigable as far as Aswan and there are about 15,000 sailing vessels on the river. All roads and railways follow the Nile Valley. The main railway line runs from Alexandria southwards as far as Aswan. From Cairo, lines run to Damietta and to Port Said and Suez. The Suez Canal is of vital importance to Egypt, though it hardly affects her trade. The imperial Air Route serves all the important towns of Egypt. Cairo has become an air port of major importance.

Situation and climate.

ABYSSINIA is an undeveloped mountainous country, having an area of 350,000 sq. miles. The climate is tropical and the maximum rainfall is in summer, which is due to monsoonal effects. Transport is extremely difficult by rail or river as the high land is deeply cut by Blue Nile

and Atbara gorges. The commercially backward condition of the country is mainly due to the difficulties of transport.

The chief industries of Abyssinia are pastoral and agricultural. Cattle, sheep and goats are numerous. The horses of the country are small but hardy, and make excellent polo ponies ; mules are bred, being used as pack animals ; donkeys are also small and serve as baggage animals. Cotton, sugar-cane, date palm, coffee and vine thrive well in many districts, and, except coffee (long berry Mocha) production is on the increase. The native produce includes hides and skins, wax, barley, millet (dhura), wheat, gesho (which serves as a substitute for hops), and tobacco, but, with the exception of hides, skins, wax, grain and coffee, production is inadequate for export. Manufacturing industries are practically non-existent. The forests abound in valuable trees including rubber. Iron is found in some districts and is manufactured into spears, knives, hatches, etc. Gold mining and washing are carried on in the western district ; coal, copper, sulphur and also platinum have been found. There are said to be valuable deposits of potash salts in the Asal salt plains in the north-western part of the country.

Addis Ababa is the capital, situated on the plateau in the centre of the country. It has direct railway communication with the French port of Jibuti. The country was conquered by the Italians in 1936, but it regained its independence after the second Global War (1939-45).

THE EASTERN HORN

ERITREA to the north-east of Abyssinia, is an arid country little developed as yet. The capital is **Asmara** and the chief port is **Massawa**. There are *pearl fisheries* along the coast, and the export trade consists of some hides and skins.

SOMALILAND, divided into French, British and Italian Somalilands, is also arid and undeveloped. **Jibuti** is the chief port of French Somaliland. **Berbera** Political divisions.

is the principal port of British Somaliland. And **Mogadiscio** is the chief port of Italian Somaliland.

EAST AFRICA

Natural regions.

Products

East Africa is divided between Britain and Portugal. The whole region consists of two board physical units : (a) *The Plateau* (which is actually a part of the high plateau of Africa) and (b) *The Coastal Plain*. The whole region lies in the tropics, and has abundant rainfall. But the Plateau Region, usually quite high, has a pleasant climate, and a moderate rainfall. Moreover, the soil is often rich. And the region is suitable for *maize* and *cotton* as well as for *coffee* and *sisal hemp*. It is also suitable for cattle. The Coastal Region, on the contrary, is hot and humid and often covered with mangrove swamps. It is suitable for *rice*, *cocoanuts*, *rubber*, *sugar*, and *spices*.

UGANDA is a British Colony, south of the Sudan. It lies wholly within the plateau region. The principal commercial product is *cotton*.

KENYA lies east of Uganda. It is also a British Colony. It is divisible into two parts—plateau and coastal plain. The chief products are *cotton* and *coffee*, besides *maize* and *millet*. **Mombasa** is the chief port of Kenya and **Nairobi** an important inland town.

TANGANYIKA lies south of Kenya. It is a British Protectorate, wrest from the Germans. **Dar-es-Salaam** is the chief port.

NYASALAND, farther south and inland, is also a British Protectorate. **Zomba** is the capital.

PORTUGUESE EAST AFRICA is formed entirely by coastal lowlands, and its southern end lies outside the tropics. **Beira** and **Lourenco Marques** are its ports ; the latter serves as the main outlet for Transvaal, South Africa.

ZANZIBAR and **PEMBA** are two islands under British protection. The chief town, **Zanzibar**, is a busy trading centre and port, noted for *spices*.

SOUTH AFRICA

South Africa consists of the Union of South Africa, a British Dominion, and a number of native states under British protection such as Basutoland, Swaziland, and Bechuanaland. The British colonies of Northern and Southern Rhodesia may also be included in this division.

THE UNION OF SOUTH AFRICA occupies the greater part of South Africa, and consists of the four ^{Units.} provinces of the **Cape of Good Hope, Natal, the Orange Free State** and the **Transvaal**. Almost the whole of the Union is in the warm temperate belt. Over much of the Union summer temperatures are pretty uniform and low for the latitude. Winters are everywhere warm. Frosts are rare and never severe. The plateau, however, experiences colder winters than the coastal areas. Most of the Union ^{Climate.} receives its rainfall in summer during the prevalence of the S. E. Trade winds. The eastern and southern coastal areas receive the largest amount of rain. The highlands prevent much rainfall from getting inland, and the Karoo are relatively dry. The small Mediterranean region in the S. W. gets winter rainfall. On the south coast there is a narrow strip which receives rain both summer and winter. The N. W. and western parts are dry regions.

As a whole, the Union is a country of poor rainfall. Actually half of it receives annually a precipitation of only 15 inches. Moreover, the rainfall is very irregular. It has been found that successively two or more years have passed without even a small rainfall on this vast portion of land. As the natural watering has got no regularity, it is vitally important to irrigate the country. South Africa has got no artesian basins such as are found in Australia, still it has a good source of water supply. The supply is not found on the level of land but is at a depth from the surface; so to utilise this water for irrigation it is required to pump up the water from below with the help of windmills. This ^{Irrigation.} is the way by which a large number of farms are regularly getting their water supply. This system is seen to be introduced with much gain over the Karroo and High

Veld. In this Union there are a number of rain-catchment dams and river dams as well, from which steady water-supply is carried out here. The important river dams are : Hartebeestpoort Dam (Crocodile River) north of Pretoria, Sundays River north of port Elizabeth, Kamnassie River near Oudtshoorn, Tarka River (tributary of the Great Fish River) near Cradock, Great Black River near fish River Hation. These are the chief sources from which the Union of South Africa—the land of scanty rainfall—is irrigating the fields for the growth of crops.

	The whole area naturally falls into two broad divisions :	
Relief.	(a) <i>The Plateau</i> ,	containing the Stormberg and Drakesberg Mountains (these are really the highest edges of the plateau), and (b) <i>The Coastal Lands</i> . Since the plateau descends to the coastal lands by a series of steps, the latter again falls into two subdivisions: (i) <i>The Karoo</i> , i.e., the series of steps, and (ii) <i>The Coastal Plain</i> . With the exception of the south-western part where the climate is Mediterranean, the whole of this territory has rainfall in summer. But the lower surface of the plateau is in the rain-shadow of the Stormberg and Drakesberg Mountains. The slope is from east to west. The whole territory of the Union can thus be divided into a number of natural regions:
Climate.	(a) <i>The Mediterranean Region</i>	of the south-west coastlands around the port of Cape Town. The principal products of the region are <i>wheat</i> , <i>barley</i> and a variety of <i>fruits</i> , such as oranges, grapes and peaches. Naturally, therefore, fruit-tinning, wine-distilling, and the preparation of jam are the important industries of this region. (b) <i>The Karoo</i> , subdivided into the Little Karoo and the Great Karoo, occupies the area lying between the Mediterranean coastal tracts and the High Plateau of South Africa. Owing to low and uncertain rainfall and the consequent poverty of vegetation this is a region of sheep farming. (c) <i>The Warm Temperate Forest Region</i> of the south-east coastlands is a region of summer rain. The principal crops are <i>maize</i> and <i>corn</i> , <i>sugar-cane</i> , and <i>tobacco</i> . (d) <i>The Veld</i> or Temperate Grassland of the south-east highlands lies between the south-eastern coastlands and the edge of
Natural Regions and Products		

the high plateau, covering the greater part of Natal, and the Transvaal, the whole of the Orange Free State, and the eastern part of Cape Colony. Large tracts are, however, covered by forests, yielding timber of some value. In the grasslands sheep farming and cattle farming are important. Much *wool* from this region is exported to England every year. But the region is very rich in mineral wealth : Coal is mined near New Castle and Johannesburg, and Minerals. exported through the ports of Durban and Lourenco Marques. Half the world's total annual output of **gold** is mined at the Witwatersrand near Johannesburg. And there are the large **diamond** mines of Kimberley and Pretoria. The Union is easily the greatest gold and diamond producing country of the world. (e) *The Desert Region* occupies the western half of the plateau and extends as far west as the coastlands. Agriculture, including live-stock rearing and mining, are the most important industries of S. Africa. Manufactures are not much developed. Manufactures of wine and brandy, fruit-canning, meat-packing, sugar-refining, etc., are the most Manufactures. important. There are a number of railway workshops also. The Iron and Steel industry of S. Africa is said to have developed considerably as a result of the last Global War. There has been a marked increase in the production of agricultural implements and machinery. The woollen industry is also developing.

The Union has about 13,000 miles of railways. The railways are of enormous importance to the country as there are no navigable rivers. The main line runs from Cape Town to Kimberley and thence to Bulawayo in S. Rhodesia. A second main trunk line from Port Elizabeth Communications. runs roughly parallel to the Cape line via Bloemfontein to Johannesburg and Pretoria. Another line runs from Durban to the interior of the plateau. From Lourenco Marques a railway runs to Johannesburg, which is a focus of railways.

The exports of the Union are consistently higher in value than the imports. Among the exports mining Trade. products are dominant. *Gold* is by far the most important export, and *diamond* and *coal* account for most of the

remainder of the value of mineral exports. Among the agricultural products exported, *wool* is the most important. *Maize* is the next largest item. *Hides* and *Skins*, *sugar*, *mohair*, *wine*, *fruits* and *dairy products* are the other large items. The leading imports are food-stuffs, machinery, textiles, chemicals, mineral oil, motor cars, etc., etc. The bulk of the trade is with the United Kingdom.

Towns. **Cape Town** is the capital and chief port of the Cape of Good Hope. **Port Elizabeth**, on Algoa Bay, is another important port of the province. **East London** on the Buffalo River, is a rising port. **Simon's Towns** is the naval station of the Union. **Pietermaritzburg** is the capital of Natal, and **Durban** its chief port. **Bloemfontein** is the capital of the Orange Free State. **Pretoria** is the capital of the Transvaal ; but **Johannesburg** is the largest town.

Divisions **RHODESIA**, now divided into the two British colonies of **Northern Rhodesia** and **Southern Rhodesia**, lies in the plateau region. But the land is said to be arable, especially in the valley of the rivers Limpopo and Zambesi ; and it is suitable for sheep and cattle also. The territories are not yet developed in any sense, although agriculture and mining are practised there. The population is exceedingly small. The whole territory is said to be rich in minerals : there are valuable **copper** mines and **coal** deposits in Northern Rhodesia ; and in Southern Rhodesia there are **gold mines**. The natural outlet of Rhodesia is the Portuguese port of Beira.

Resources.

ANGOLA is a Portuguese possession. The territory is said to be suitable for cattle farming. **Lobits** is the port, and **Loanda** the capital.

Extent. **THE BELGIAN CONGO** occupies the greater part of the Congo Basin, which is the most notable Equatorial region in the world after the great Amazon Basin of S. America. It is a hollow-shaped plateau drained by the Congo and its tributaries which have their sources generally in the mountain fastnesses of the high plateau of South Africa. Owing to the unbearable humidity of the atmos-

Characteristics.

where the lowlands are covered with dense equatorial forests and the uplands with savana or grassland. The typical products of the forests are *rubber*, *oil palm*, *palm kernels*, and *copra*. The Congo forests are the homelands of numerous herds of elephants, and one of the most important products of the region is, therefore, *ivory*. In the interior is the **Katanga** region, a southern appendage of the Belgian Congo, believed to be rich in mineral reserves, especially in **copper**. **Elisabeteville**, *the metropolis* of Katanga, is the chief centre for the mining of copper. There are **iron** and **lime** also in close proximity to the copper fields. Other minerals worked are **gold**, **tin**, and **diamonds**. Katanga lies close to Rhodesia, and indeed, from the geographical point of view, it is more a part of the latter than of the Belgian Congo. Coal and foodstuffs for the miners are, therefore, obtained from Rhodesia. The capital of the Belgian Congo is **Boma**; it is also a port of importance. **Matadi**, about 100 miles from the sea, is another important port accessible by ocean-going vessels. **Leopoldville** and **New Antwerp** (formerly **Bangala**) are important towns. There are railway communications between Matadi and Leopoldville.

THE GUINEA COAST

The Guinea Coast is divided amongst Britain, France, Portugal, and Spain; but there is a small Negro republic also. The whole of this region may be divided into two physical units: (a) *The Plateau Regions*, and (b) *The Coastal Plain*. The Plateau Regions have a comparatively light rainfall and a poorer soil covered by savana or grassland. The principal food crops of this region are *millet*, *maize*, *rice*, and *ground-nuts*. *Cotton* is also important. Minerals sometimes occur as, for example, **gold** and **manganese**, in the Gold Coast; and **tin** and **coal** in Nigeria. The coastal plain has a heavy rainfall and a hot damp climate. In the damper parts the typical vegetation is evergreen equatorial forest, in the drier parts occur deciduous forests. The principal forest products are

mahogany, ebony and other hard timbers, *wild rubber, oil palm*, etc. There are rubber plantations as well, and large quantities of *cocoa* are also produced. *Rice, manioc, maize*, and *cocoanuts* are also cultivated.

LIBERIA is a Negro Republic founded in 1820 for the liberated slaves. The territory is undeveloped. **Monrovia** is the capital.

GAMBIA is a small British Colony of only 4 sq. miles ; but the Protectorate has an area of about 4,000 sq. miles. The capital is **Bathurst**. The exports consist of *rubber, cotton, hides* and *ground-nuts*.

SIERRA LEONE consists of another British Colony and Protectorate. Its exports are *rubber, palm oil* and allied products. **Freetown** is the capital and chief port ; it is a coaling station, and has a good harbour.

NIGERIA also consists of another British Colony and Protectorate. Its exports are *rubber, palm oil, cocoa, cotton, coffee, gum*, etc. The capital and chief port is **Lagos**.

GOLD COAST also consists of a British Colony and a Protectorate. The chief exports are *palm oil, rubber* and *cocoa* (nearly half the total world supply). Gold, diamond and manganese are minerals exported. The bulk of the trade is with Britain. The principal port is **Accra**.

FRENCH WEST AFRICA includes all the territories from Cape Blanco to the Congo, with the exception of those under other European Powers. The principal units are **Senegal**, with its capital of **Fort Louis** ; **Dahomey** with its capital of **Porto Novo** ; and that indefinite territory known as **FRENCH EQUATORIAL AFRICA** extending up to the Nile Basin. All the possessions are economically undeveloped. Senegal is commercially the most important. The main exports are *groundnuts, palm oil, hides* and *skins, rubber, cotton, fruits* and *timber*. **Dakar** is the principal port of Senegal and capital of Fr. West Africa. **St. Louis** is also another important port.

ISLANDS OF AFRICA

Madagascar is one of the largest islands in the world. It is a French colony. The island consists of a plateau in the centre, surrounded by coastal plains. It is covered with dense forests, from which *rubber* is obtained. *Hides* are exported. The capital is **Antana** in the centre, surrounded by coastal plains. It is covered with dense forests, from which *rubber* is obtained. *Hides* are exported. The capital is **Antananarivo**.

Mauritius, **St. Helena**, and **Ascension** belong to Britain. The French island of **Réunion** lies near Mauritius. Mauritius is noted for the production of sugar cane.

QUESTIONS

1. "Egypt is the gift of the Nile"—Discuss.
 2. Carefully examine the geographical position of Egypt in relation to world trade routes.
 3. Discuss the present economic condition of South Africa with special reference to its (a) mineral resources (b) pastoral industry.
 4. What commercial interests induced Britain to colonize in Africa ?
 5. Discuss the present position of the economic development of Abyssinia.
 6. Describe the present development of irrigation in S. Africa and examine its possibility.
 7. Mention the economic resources of the British possessions in Equatorial Africa. What are the prospects of developing these resources and how will the Indian trade be affected by this development ?
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CHAPTER IV

EUROPE

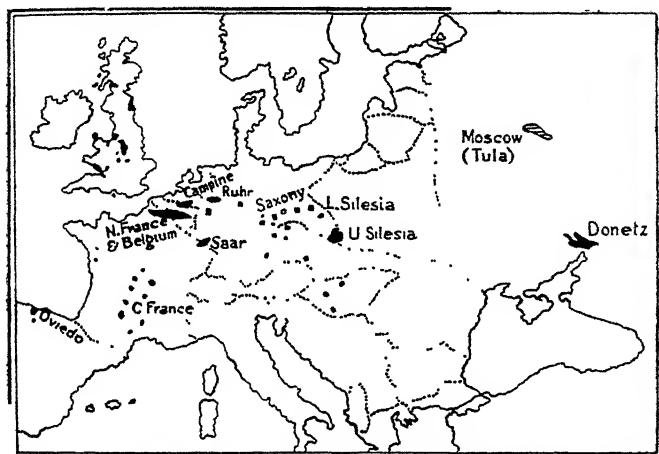
The Cradle of Western Civilization

Area.	Position and Size. —The continent of Europe is actually a peninsula of the greater land mass of Asia—a mere appendage. With the exception of Australia, it is the smallest of the continents, the area being 3,760,000 sq. miles. It has a westerly situation, and nearly the whole of it
Location	(except a small fragment in the north) lies within the Temperate Zone. The coast-line is relatively the longest—nearly 20,000 miles, <i>i.e.</i> , there is one mile of coast to every
Coastline.	190 miles of surface. No part of Europe is thus even 1,000 miles from the sea.

Physical Features.—Although quite small in area for a continent, Europe has a fairly varied topography. At least three broad divisions may be distinguished :

Scandinavian, Highlands, Iceland, N. Ireland.	1. The Mountain Regions of the North , comprising the Scandinavian Mountains, the island of Iceland, the Highlands of Scotland, and the mountains of Northern Ireland.
Sweden to Black Sea, France to Urals.	2. The Great European Plain , stretching from the lowlands of Sweden to the border of the Black Sea, and from Western France to the Urals. Besides the Great European Plain, two of the most important plains are the Plain of Hungary and the Valley of the Po.
Fold Mountain chains.	3. The Alpine Region on Southern Europe, actually a complex of plateaus and enclosing fold mountain chains. The central mountain knot here is formed by the Alps, from which a number of chains are given off in all directions to form the Appennines of Italy ; the Sierra Nevada, the Pyrenees, and the Cantabrian Mountains of Spain ; the Dinaric Mountains, the Carpathians, the Transylvanian Alps and the Balkan Mountains of the Balkan

Peninsula ; and the **Jura Mountains** on the north-west of the main mountain knot of the Alps. The Appennines, after entering the island of Sicily, are continued as the Atlas chains of North Africa. Between the Cantabrian and Pyrenees on the north and the Sierra Nevada on the



The Coalfields of Europe.

south lies the plateau of Spain and Portugal, called the Plateaus. **Meseta**. North of the Pyrenees lies the **Central Plateau** of France. The **Bohemian Plateau** lies enclosed by a mountain chain north of the Alps-Carpathian chain. And then there are the small plateaus of the islands of Corsica and Sardinia.

Geology and Minerals.—The geology of Europe is not so complicated as that of Asia, and what is more im-Geology. portant still is the fact that it has been studied much more thoroughly than that of any other continent as many of the geological terms—Caledonian, Cambrian and Alpine earth movements, for example,—clearly indicate. Broadly speaking, the mountain masses of Northern Europe consist of ancient crystalline rocks resistant to later Alpine folding. And some of the southern plateaus are also of the same composition. The Alpine chains are, of course, of tertiary

Mineral Resources fold sediments. Coal is found in Scottish low lands, England, Wales, Belgium, N. France, Germany, Czechoslovakia and U. S. S. R. Europe, as a whole, is deficient in mineral oil ; Rumania and U. S. S. R. are the important producers. France and Germany raise small quantities. France is noted for its Bauxite and potash salt. Italy produces a large quantity of sulphur. Iron ore occurs in Great Britain, France, Germany and U. S. S. R.

General facts.

Conditions in winter.

Conditions in summer.

Rainfall.

Climate.—Climatically Europe is exceptionally fortunate in her westerly situation ; for the entire continent lies in the Westerly Wind Belt in winter, and even in summer a comparatively large portion of it is under the influence of the Westerlies. Moreover, the warm North Atlantic Drift flows along the western coasts of the continent, keeping the whole seaboard warm and free from ice in winter. But, of course, it is then colder and colder on the mainland, though in a modified degree in comparison with the conditions prevailing in Central Asia. With the advent of summer, however, this state of affairs is modified : with the gradual swing of the wind systems towards the north as the sun progresses towards the Tropic of Cancer, Southern Europe falls outside the Westerly Wind Belt, and forms part of the high-pressure belt from which the North-East Trade Winds begin to blow westward. Thus the Mediterranean Region of Europe is dry in summer, But the whole of the continent being under the influence of the Westerlies, the Mediterranean Region receives its share of rainfall in winter ; and the rest of the continent have rainfall all the year round, although each place has its own seasonal maximum. The broad climatic zones into which Europe can be divided as well as its natural vegetation have been indicated elsewhere.

NORTH-WESTERN EUROPE.

Political Divisions.

THE BRITISH ISLES consist of two large islands, **Great Britain** and **Ireland**, together with innumerable smaller islands of varying size off the north-west coast of Europe. Great Britain comprises **England**, **Wales**, and **Scotland** which together form a single kingdom, while

Ireland is divided into the two political units of **Northern Ireland** and the **Irish Free State** or **Eire**. The term, **United Kingdom**, now means the United Kingdom of Great Britain and Northern Ireland. The total area of the British Isles is about 121,000 sq. miles—roughly the same size as that of the Bombay Presidency. But England, the largest country in the British Isles, is smaller than Assam. The most noteworthy feature about the geographical location of the British Isles is perhaps their central position in the Land Hemisphere of the globe. Moreover, there is an extensive continental shelf around, and the coast-line is long and deeply indented so that even the remotest corner in the British Isles is not even 100 miles from the sea.

We can divide the different political units into a number of well-defined physico-structural units. **Scotland** is divisible into three parts : (a) *The Highlands*, covering roughly the northern half of that country ; (b) *The Midland Valley*, bordering the Highlands on the south ; and (c) *The Southern Uplands*, west of the Midland Valley. The Highlands are mainly of old crystalline rocks, and in some places of interpenetrating granite formation, yielding building stone. There are stone quarries at Peterhead and Aberdeen. The soil is poor and the region covered with moorland, except for the small eastern valleys and coastal areas. The Southern Uplands, on the contrary, consist of a broad but low fold range, furnishing a poor soil, that is suitable for sheep. The Midland Valley is actually a rift valley formed by a sedimentary block, bordered on both sides by rocks of ancient sandstone, and containing three extensive coal basins—the Ayrshire Basin in the west, the Midlothian and Fifeshire Basin in the east, and the Lanarkshire or Clyde Basin in the middle. Running down the middle of north **England** is (a) a mountain backbone called the *Pennines*, north-west of which is (b) *Cumbria* or *The Lake District*, formed by ancient rocks in the centre and overlaid on all sides by younger rocks. Then there is the great (c) *Midland Plain* covering the greater part of the country, and (d) *The South-Western Peninsula* of Devon and Cornwall, consisting of masses of granite intruded into ancient

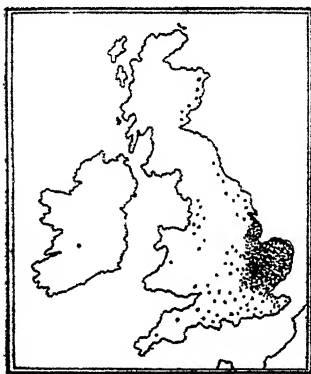
rocks, a region fairly rich in various metalliferous minerals. The whole of **Wales** is mountainous ; in the north are the (a) *Cambrian Mountains*, formed by ancient crystalline rocks. But (b) *South Wales* consists largely of younger folded rocks, with the South Wales coal-field. The greater central part of **Ireland** is a hollow plain, nearly encircled by mountains.

Climate.	For its latitude the British Isles have pleasant and equable climate . This is attributed to the warm and moist Westerlies (S. W. Anti-Trades) and the warm North Atlantic Drift. But the weather is capricious, because the
Rainfall.	Westerlies are not steady like the Trade Winds or Monsoons. Rainfall is fairly distributed all over the country, but owing to the mountainous nature of the west it is heaviest in that section ; and although there is rain all the year round, the maximum precipitation occurs in autumn. No part of the island has, in the coldest month, an average temperature below freezing, nor is the average for July anywhere above 63°F. Thus the winters may be classed as mild, the summers cool and cloudy. The natural vegetation of the
Vegetation	British Isles is deciduous forest, and the shedding period of the broad-leaved trees is in winter. Some conifers are found in the north and on the hills. But as in China, although largely for a different reason (for Britain is essentially an industrial country), the natural vegetation of the country has been nearly wiped out.

Fisheries.	Fishing is an important industry of Great Britain. The fishing grounds are the North Sea, the Irish Sea, St. Georges Channel, the Bristol Channel and the shallow waters off the northern, western and southern coasts of Ireland. But the fishing regions visited by British ships are by no means confined to these areas only and the British fishery-area now extends over more than a million sq. miles, from the coastal waters off Morocco in the south to the Arctic Ocean in the north. The most important fish ports are London, Grimsby, Hull, Lowestoft, Yarmouth, Fleetwood, Milford and Aberdeen. The North Sea is the greatest of the British fishing grounds, wherein the <i>Doggers</i>
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Bank abounds in fish. The depth of water there is not more than 25 fathoms. *Herring* and *Cod* form about 60 per cent., of the total catch. *Pilchards*, *Mackerel*, *Halibut*, *Haddock*, etc., are also caught. About 700,000 tons of fish are landed annually at British ports. In spite of heavy home consumption a surplus of 200,000 tons is available for export.

Agriculture—The United Kingdom is highly industrialised but its agricultural output is small. As a result the country is dependent on the rest of the world for food-stuffs. Britain produces sufficient food every year to support the population for only six weeks. About one-fourth of the area is under cultivation while more than twice that



The Wheatlands of
British Isles.



The Oat-lands of
British Isles.

amount is in permanent grass and pasture. The distribution of the two principal food crops in the British Isles may be noted in the accompanying diagrams. To understand this distribution thoroughly we must remember that moorland occupies large tracts of Great Britain in the mountainous north and west, and even in the Midlands more than half the total area is under permanent grass for the sheep. Moreover, Scotland is too cold and Ireland too damp for *wheat*, which is the chief food crop. The largest concentration of wheat is, therefore, in the drier south-east. *Oats* are also grown mainly in the drier east, but their

Products

range is greater as they can ripen in a colder climate. Intensive agriculture is practised, and mixed farming and crop rotation are the general rule. Other important crops are *barley*, various *root crops*, *sugar beet*, *peas*, *beans*, *fodder crops*, *hay* and *fruits*. The distribution of barley is similar to that of wheat ; sugar beet is distributed mainly in the east of England, and some *flax* is also grown in Ireland. Only 8 per cent of the population in Great Britain are farmers. Britain is one of the leading *wool-producing* countries, and her wool has always been noted for its quality. There are over 20 million sheep of various breeds in the country. The number of cattle is half that of sheep, but they are more important than the latter in Ireland because of the damper climate there. The number of pigs in Britain is above 3½ million, and about 1½ million in Ireland. Owing to transport facilities draught animals are, however, becoming rare ; the number of horses on the farms, for example, is now about 1 million only.

Minerals

The **mineral** position of Great Britain is peculiar : about 90 per cent of the total output of minerals consists of *coal* only. "Thus coal has an overwhelming dominance among the British minerals from the point of view of value of annual production, but even this does not measure its real importance to the country. It provides indispensable domestic fuel in a densely populated country that is virtually without timber ; it provides the power for practically all the industries ; and it provides the only bulky commodity for export from a country which in the main has exports that are far less bulky than the raw materials and food-stuffs that are imported. By enabling ships that would otherwise leave empty to carry a cargo it has helped to reduce freights on inward cargoes, and so has enabled the general population to get food-stuffs and the manufacturers to get their raw materials at the lowest possible cost."¹

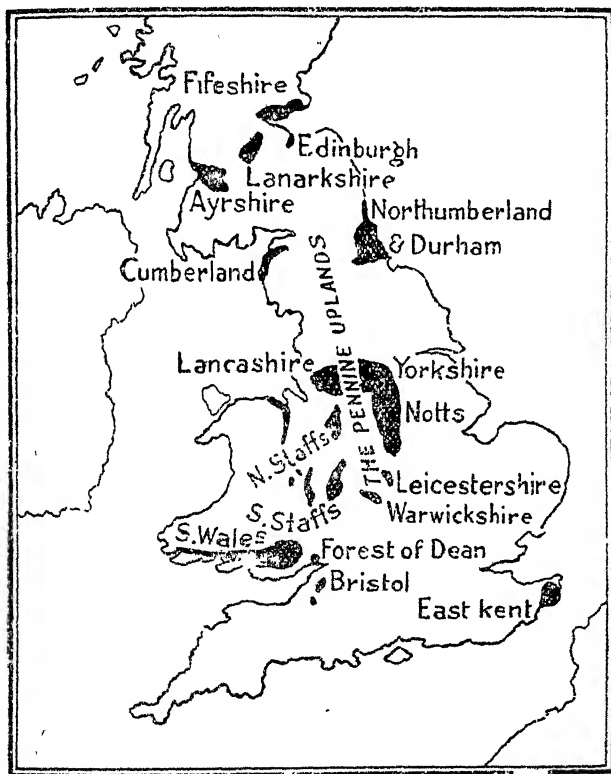
Coal.

The coal-fields of the British Isles are found mainly in Scotland, England and Wales. In annual production the

¹ R. O. Buchanan—An Economic Geography of the British Empire.

British Isles stand second only to the United States. The coal is also of good quality ranging from bituminous to anthracite in character. In Scotland the coal-fields lie mainly in the central lowlands. There are four important fields. (1) The *Ayrshire Field* adjoins the Ayrshire coast, (2) The *Lanarkshire Field* stretching from the Clyde above

Scottish
coal-fields.



The Coalfields of Great Britain.

and below Glasgow, across the Forth, in the neighbourhood of Stirling. (3) The *Fifeshire Field* in the north-east. (4) The *Midlothian Field* which is only the continuation of the Fife Field across the Firth of Forth, lies east and south-east of Edinburgh. The Lanarkshire coal-field being situated in the industrial area of Scotland, the whole of

Scottish
coal-fields.

**English
Coal-fields.**

**Relation to
industries**

**Welsh
coal-fields.**

Iron ore

its output is consumed locally. The five important coal-fields of **England** are on either side of the Pennines. They are (1) Cumberland coal-fields, (2) Lancashire coal-fields, (3) Midland coal-fields which include the coal-fields of North Staffords and South Staffords. (4) North-East coal-fields which consist of the Northumberland and Durham coal-fields. (5) Yorkshire coal-fields. Besides these there are three small coal-fields in Leicestershire, Nottinghamshire and East Kent. Near about the *Cumberland coal-fields* there is no important industrial region excepting at Barrow, where there is some amount of iron smelting. *Lancashire coal-field* has helped the cotton industry of England to attain the position it has gained now. The important centres of cotton industry, lie near this coal-field. *Yorkshire coal-field* opposite to the Lancashire coal-field on the other side of the Pennines is an important seat of woollen industry. The climate is dry, therefore it helps the manufacture of woollen articles. In the South of the coal-field is Sheffield which is noted for its cutlery. *Midland coal-fields* consist of the small coal-fields in the *North and South Staffordshire*. The surrounding towns of Stoke, Burslem etc., are pottery towns. In Birmingham varieties of small iron articles are produced. The North-East coal-fields which include the coal-fields of *Northumberland* and *Durham*, are great iron-smelting regions. The iron ore is supplied from the Cleveland fields of Yorkshire and from foreign countries also. Newcastle is a great ship-building yard. The chief seat of iron smelting is at Middlesbrough. There is leather industry near the *Leicestershire coal-fields*. In **Wales** there are two fields—(1) The *North Wales Field* which produces only steam-coal. It is a small field. (2) The *South Wales Field* produces very good quality anthracite. Tin plating and the smelting of iron, tin and copper are the important industries in the neighbourhood.

Iron is Britain's most important mineral commodity after coal ; much of Britain's industrial prosperity has been traced to the association of iron ores and coal. But of the total mineral output of Britain at the present time, iron-ores constitute only about 1·5 per cent., and iron ores are

no longer—or very little, if at all—worked in the coal-field region. The bulk of it is obtained from the *Cleveland Field* in Yorkshire and from the Midlands—*Lincoln, Rutland* and *Northampton*. These ores are of poor quality and the total output is quite inadequate for her own requirements. So, large quantities of good quality ores have to be imported from Spain and Sweden. Other metals include **Tin** and **Copper** in Cornwall and **Lead** in Wales and Derbyshire, besides *building stones, road materials* and *China clay*. But ^{Other} the production of metals has diminished considerably. ^{minerals.} *Salt* worked chiefly in Cheshire, supports chemical industries.

The distribution of Britain's **Manufacturing Industries** has naturally been governed by a desire for location in the coal-field regions for obvious reasons. But a special feature of British manufacturing industries is localisation ^{Manu-} and specialisation. ^{factures.} The *Textile Industries* form a very important group among the manufacturing industries of the British Isles. They support probably over 4 millions of people. The most important of these is the **Cotton Industry** which is located in—or almost restricted to—the Lancashire coal-field region in England and Glasgow region in Scotland. This localisation, especially in Lancashire, has been attributed to three causes besides the proximity of the S. ^{Localisation} Lancashire coal-field region—(a) the manufacture of wool- ^{of cotton} lens from the wool of the Pennine sheep was an early industry in England, and thus here have been born genera- ^{industry.} tions of spinners and weavers ; (b) secondly the damp climate and the soft water from the Pennine streams are eminently suited to cotton manufacturing ; (c) thirdly the Lancashire region possesses enormous facilities for importing cotton from America and for exporting the finished goods through *Liverpool* and *Manchester*, the two most important West Coast ports of England. Even spinning and weaving are largely localised. "Not only do towns specialise as between spinning and weaving, but spinning towns specialize on particular types of yarn and weaving towns on particular kinds of cloth." The chief spinning towns are **Bolton, Bury, Rochdale, Oldham, Wigan** and **Stockport** ; while the weaving towns are **Preston**,

Blackburn, Accrington and Burnley. Manchester is no longer an important cotton-manufacturing town but it is the commercial and financial centre of the industry. **Liverpool** is the great port of this region, but supplies of raw cotton are now directly available in Manchester by the completion in 1896 of the Manchester ship canal. The



The Industrial Regions of Great Britain.

Lancashire coal-field in Scotland, also has a cotton industry around **Glasgow** and **Paisely**. It is of less importance compared with Lancashire. Its advantages of soft water, climate and coal are similar to those of Lancashire. Glasgow is nearer than Liverpool to the cotton-producing tracts of the U. S. A. This area is particularly noted for sewing thread.

The **Woollen Industry** ranks second in importance among the textile industries of the U. K. It is much more widespread than the Cotton Industry. The **West Riding of Yorkshire** is the most important woollen manufacturing centre of the British Isles. The *geographical advantages* are the abundant supply of soft water for bleaching and dyeing purposes, presence of coal, the existence of an ample supply of labour and supply of wool from the neighbouring regions. Now, most of the wool has to be brought from elsewhere. The wool comes chiefly from Australia and New Zealand, South Africa and Argentina. **Bradford** is the principal centre of the industry, both industrially and commercially. **Leeds** is more important for engineering than for spinning and weaving. Other important towns are **Huddersfield**, **Halifax**, **Keighley** and **Wakefield**. Halifax is noted for carpets. The **West Country** woollen industry of *Somerset, Wiltshire, Oxford and Gloucestershire* is now relatively unimportant. **Witney** makes blankets and **Stroud** specialises in the weaving of fine clothes. In **Leicester** and **Nottingham** (*Midlands*) hosiery industries are important. The **Scottish Woollen Industry** is centred in the Tweed Valley. The industry obtains soft water and water-power from the Tweed and its tributaries, wool supplies from the Cheviots and coal from the Midlothian fields. **Galashiels**, **Selkirk** and **Hawick** are the chief centres. In Ireland the principal centre of the woollen industry is **Belfast**.

Location of
Woollen
Industry.

Other textile industries include linen, silk and jute. **Linen** is made from the fibre of the flax plant, which is a very important crop in N. Ireland. The industry is important in Northern Ireland, principally at **Belfast**, **Londonderry**, and **Lisburn**. The **Jute** industry is localised at **Dundee** in Scotland. The jute is imported from India and made into carpets, gunny cloths, etc. **Silk** was once an important industry in England, but it is now concentrated in the **Macclesfield** district in south-east Cheshire. Many **Rayon** or *artificial silk* factories have been established in the textile districts of Yorkshire, Lancashire and Cheshire ; whilst other centres are found in

Other
Textile
Industries.

E. England such as at **Braintree** and **London**. It is an industry of recent growth but is rapidly increasing in importance.

Iron-smelting.

Other industries.

Ship-building.

The **Iron and Steel Industry** is one of the leading industries of the British Isles. The industry can be divided into two main branches—(1) smelting and steel producing and (2) those industries that use iron and steel as raw material. Iron-smelting is carried on in North Yorkshire, South Durham, Cumberland, North Lancashire, South Wales and Midlands. The greatest concentration of iron-smelting is in the **Teesmouth Area**, which is close to Durham coal and Cleveland Hills iron-ore, besides being able to import foreign ores. **Middlesborough** is the most important iron-smelting centre. The other centres are at **Fordingham** (Lincolnshire), **Blanbury** (Oxford), **Leeds** and **Rotherham** (Yorkshire), **Wigan** (S. Lancashire), **Barrow** (Cumberland) and **Corby** (Northampton). **Airdrie** and **Coat-bridge** are the important Scottish centres. The home production of iron-ore is inadequate and large quantities have to be imported from Spain and Sweden. Manganese is also imported mainly from India. *Iron wares* and *Cutlery* are manufactured at **Birmingham** and **Sheffield**. The manufacture of *Motor Cars* is centred at **Birmingham**, **Coventry** and **Oxford**. *Railway Stocks* are manufactured at **Doncaster**, **Crewe** and **Swindon**. **Swansea** is practically the only centre of *tin-plate industry*. The chief centres of **Ship-building** are **Greenock**, **Port Glasgow**, **Dumbarton**, and **Clydebank** (on the *clyde*), **New Castle**, **Jarrow** and **Wallsend** (on the *Tyne*), **Sunderland** (on the *Wear*) and **Middlesborough** and **Hartlepool** (on the *Tees*). The Irish centre is at **Belfast**. Not very many years ago, London on the Thames was the chief seat of ship-building. At that time vessels were made of wood. But with the use of iron in ship-building, the importance of London is gone.

Among the minor industries in Great Britain the *Chemical Industries* are very important. A variety of chemical products are manufactured and these are widely

used in other industries. Salt and coal are the chief requirements of these industries. Cheshire and South Lancashire—the two great salt-fields of the country—are the most important chemical manufacturing regions. The West Riding of Yorkshire, the London Area and the Scottish Lowlands are also noted for chemicals. Dyes, mineral acids, alkalies, soaps, margarine, medicines and drugs, candles, etc., are the chief products. Chemical Industries.

Tanning and manufacture of Leather goods are also important industries. These industries are not much dependent on coal. The localisation of these industries is mainly determined by the supply of raw materials. At Nottingham and Leicester it grew up on local hides and skins, soft water and tanning materials from the neighbouring oak forests. Now-a-days the raw material is imported, so the industries are localised in or near about the great ports, which are best suited for the import of hides from the U. S. A., France, Germany and India. London is the most important area. Leather Industry.

Other industries include *Glass manufacturing* (Leeds, Glasgow, Birmingham and London), *Potteries* (Stoke, Burslem, Hanley, Longton and Tunstall), *Rubber manufacturing* (Birmingham), *Flour-milling* (London, Hull, Liverpool, Glasgow, Cardiff), *Sugar-refining*, *Chocolate manufacturing* etc., etc. Minor Industries.

Internal trade is carried on by road, railway, and canal and by coasting-vessels. The country is covered by a net-work of railways and canals. Roads are also important and there are now regular motor services between nearly all the important cities of Great Britain. Natural communications by water comprise the sea and the rivers. The rivers of Great Britain are not very advantageous for inland shipping, as they are neither very long nor very wide. Moreover, they are often winding in their courses and have shallows or rapids. But the lower courses of the larger rivers are often navigable from their mouths by the largest ocean-going lines and constant dredging. Inland communications.

Water-ways.

operations enable them to penetrate far inland. Such, for instance, are the Thames, Humber, Tyne, Firth, Tay, Clyde, Mersey and the Severn. Many towns on their banks, even a considerable distance inland, are accessible to coastal shipping. Canals are not very important except over the Midlands. Judged by continental standards, all English canals are small. The typical barge is of only 24 tons as compared with 300 tons in Germany. The ship-canal of the country are the most important and serve the industrial regions of the country. *The Manchester Ship Canal* enables ships to travel up the Mersey as far as Manchester. The canal is about 35 miles long. Manchester has been converted into a sea-port by the opening up of this canal. Great Britain is very well served by railways and has 20,400 miles of railway although it is 1/20th the size of India. The Railways are grouped into four systems—(a) *The London—Midland—Scottish System* (7,464 miles), serves Central and North-Western England and most of Scotland. It passes through the great industrial regions of the West Ridings (Yorkshire), the Midlands, Cheshire and Lancashire and the Scottish lowlands. (b) *The London North Eastern Railway* (6,464 miles), serves the east coast fishing ports, the eastern agricultural districts and the New Castle industrial region. (c) *The Great Western System* (3,675 miles), serves the industrial towns of the “Black Country”, Wales and South Western England. (d) *The Southern Railway* (2,129 miles), serves the area to the South of London. It serves no industrial area and is dependent mainly on passenger traffic. London is the “focus” of all these railway systems. Almost all the important cities and ports have direct railway connection with London.

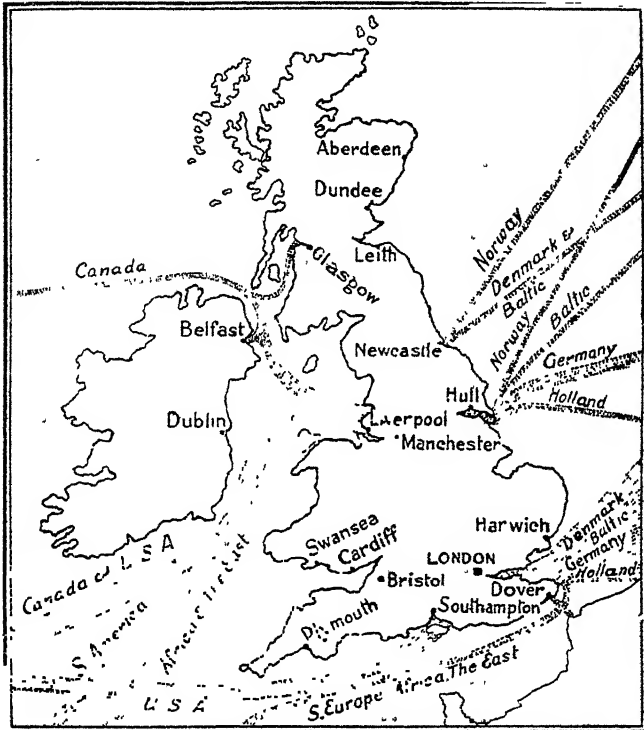
Railways.

The principal ports of the British Isles have been dealt with in some length elsewhere.

Commerce.

Great Britain's prosperity depends mainly on her foreign trade. Her excellent situation in the centre of the land hemisphere, facing the continent of Europe, the

existence of commodious estuarine ports and the highly industrialised economy of the country greatly encourage



British Ports and Trade Routes

foreign trade. The following tables show the important exports and imports of Great Britain.

The Exports of the United Kingdom

Commodities.	Percentage of Total Value		
	1924	1926-30	1950-54
Raw materials		13·6	13·4
Coke & coal	2·8	6·4	8·7
Foodstuffs	—	5·9	5·4
Fish	1·1	1·1	1·1
Spirits	1·5	1·3	1·6
Manufactures	—	71·3	57·2
Cotton goods	24·9	19·2	15·3
Yarn	3·5	3·0	2·7
Thread	0·9	0·9	1·1
Iron & Steel	9·3	8·3	6·9
Machinery	5·6	7·4	8·9
Automobiles	—	2·4	3·3
Ships	0·7	1·8	1·1
Electricals	1·3	1·8	1·9
Railway vehicles	—	1·4	0·6
Woollens	8·5	7·2	6·9
Tissues	5·2	4·6	3·8
Yarn	2·0	1·5	1·6
Tops	0·8	0·7	0·8
Silk (& artificial)	0·3	1·4	1·3
Linen Yarn & mf.	1·7	1·4	1·5
Apparel	3·8	3·7	3·0
Paper &c.	—	1·4	1·6
Rubber goods	—	1·3	1·4
Glass & earthen ware	1·6	1·9	2·0
Leather goods	1·5	1·1	0·9
Chemicals	3·2	3·5	4·7

The Imports of the United Kingdom

Commodities	Percentage of Total Value		
	1924	1926-30	1950-54
Raw materials	23·3	25·4	24·6
Cotton	9·5	6·0	4·6
Wool	5·5	4·7	4·9
Wood & wood pulp ..	4·0	4·8	5·5
Petroleum	—	3·6	4·2
Rubber	0·8	1·7	0·9
Hides, skins & furs ..	1·7	2·2	2·1
Zinc, lead, tin, copper, ores	1·8	2·4	1·8
Oil-seeds & nuts	4·1	1·4	1·5
Foodstuffs	37·9	31·7	37·0
Meat (for dried)	15·8	17·9	22·2
Animals	1·7	1·1	1·2
Grain & flour	9·5	8·3	8·7
Wheat	5·4	5·0	4·1
Maize	1·3	1·1	1·5
Wheat meal & flour ..	0·7	0·6	0·5
Butter	4·3	4·2	5·2
Tea	3·2	3·1	3·6
Sugar	3·5	4·0	2·0
Fresh Fruit	2·5	2·9	4·0
Eggs	1·5	1·4	1·2
Cheese	1·1	1·2	1·1
Tobacco	1·2	1·4	1·7
Manufactures	8·7	10·6	14·4
Silk yarns & mf.	2·0	1·2	0·6
Wool yarns & mf.	1·2	2·5	1·9
(with apparel)	0·7	0·8	0·5
Cotton yarns & mf. ..	1·7	2·3	1·5
Iron & steel mf.	0·8	1·4	1·6
Machinery	1·1	1·2	1·1
Leather mf.	1·2	1·3	1·0
Chemicals	—	1·5	1·8
Paper &c.	—	—	—

Direction of Foreign Trade of U. K. EXPORTS

Countries.	Percentage of Total Value		
	1924	1926-30	1950-54
India	11.3	11.2	6.8
Australia	7.8	7.2	5.6
U. S. A.	6.6	6.3	5.0
Eire	5.3	5.5	6.2
Germany	5.4	5.1	4.3
Canada	3.5	4.6	4.8
South Africa	3.8	4.2	6.2
Argentina	3.4	4.0	3.4
France	5.2	3.9	5.0
Netherlands	3.1	3.1	3.2
Belgium	2.8	2.9	2.5
New Zealand	2.6	2.7	2.8
Italy	2.2	2.0	2.3
Empire	41.7	45.6	45.7
Foreign countries	58.3	54.4	54.3

Direction of Foreign Trade of U. K. IMPORTS

Countries.	Percentage of Total Value		
	1924	1926-30	1950-54
U. S. A.	18.5	16.3	11.6
Argentina	6.2	6.1	6.4
Germany	2.9	5.6	4.9
India	6.2	5.1	4.0
France	5.3	4.9	3.3
Denmark	3.8	4.6	5.2
Australia	4.6	4.4	6.6
Canada	5.2	4.4	6.2
Eire	4.0	3.8	3.2
Netherlands	3.3	3.8	3.3
New Zealand	3.8	3.9	5.1
Belgium	2.8	3.0	2.5
U. S. S. R.	1.5	2.2	2.8
Sweden	1.6	2.0	2.3
Empire	3.0	1.9	1.6
Empire	30.2	27.1	33.5
Foreign countries	69.8	72.9	66.5

Superficially viewed, the foreign trade of the United Kingdom shows an adverse balance ; for there is a large excess in the total value of imports over that of exports. But the United Kingdom derives great benefits from investments elsewhere, and the value derived from this source is about one-half of the total obtained from the exports. Moreover, receipts from shipping constitute about one-third of the total value of the export trade. And last, but not the least, the United Kingdom carries on considerable *entrepôt* trade, and the receipts accruing therefrom are also quite considerable.

Exports of Imported Commodities from U. K.

Commodities	Percentage of Total Value		
	1924	1926-30	1950-54
Raw materials			
Wool	22·4	22·3	22·3
Rubber	7·2	13·2	3·7
Hides	1·4	1·2	0·7
Skins & furs	8·0	8·6	12·4
Cotton	8·3	4·9	3·3
Jute	0·3	0·3	0·4
Petroleum	—	1·3	1·9
Tin	1·8	1·7	1·2
Foodstuff			
Tea	5·0	6·8	8·7
Meat	—	3·1	2·3
Fish	—	1·4	1·2
Spices	—	0·9	0·4
Tobacco	—	0·7	1·3
Coffee	1·2	1·8	2·7
Butter	—	1·2	1·9
Fruits	—	1·2	2·1
Maize	0·7	0·6	0·9
Wine	0·5	0·5	0·7
Manufactures			
Leather	1·3	1·7	2·0
Silk	2·5	1·4	0·8
Carpets & rugs	—	1·3	1·0
Cotton	1·8	0·7	0·3
Machinery	—	1·4	1·2
Artificial silk	—	0·6	0·9
Drugs	—	1·4	1·7

NORTHERN IRELAND has an area of only 5,237 sq. miles, and a population of about 1·28 million.

The inhabitants are mainly of English and Scotch descent.

Products. The chief agricultural products are *oats and flax*. The capital is **Belfast**, where there are textile mills (for spinning flax and weaving linen and cotton), distilleries, and ship-building yards. Another seat of textile industries is **Londonderry**.

THE CHANNEL ISLANDS together comprise a total area of 75 sq. miles only. The principal products are *potatoes, tomatoes, and grapes*.

EIRE or the **Irish Free State** is a self-governing democracy. The total area is 26,592 miles, and the population 2'97 million. The principal crops in the order of their importance are *oats, potatoes*, and various other *root crops*, as well as some *barley* and *wheat*. Large number of domestic animals are kept ; and the country, with its hurried weather conditions and extensive ill-drained areas, is said to be more suitable for stock-raising than agriculture. The principal manufacturing industry is concerned with the preparation of liquors. There is a large water-power station at Limerick for harnessing the flowing waters of the Shannon, the largest in the British Isles, which provides electricity for the entire country, and to a large extent compensates for the want of coal. Under the present regime the country is endeavouring hard for economic self-sufficiency. About 90 per cent of the total trade was with the United Kingdom ; but a decline has been in evidence for some years.

Products.

SCANDINAVIA

Scandinavia is a mountainous peninsula on the north-west of Europe, and resembles the island of Great Britain in topographical as well as structural features. The coast-line is long and deeply indented, especially on the west, and the inlets, often quite considerably long, are called '*fjords*'. Often again these long narrow fjords are bordered by vertical cliffs rising directly out of the water. Near the west coast is a long ridge of mountains, consisting of very

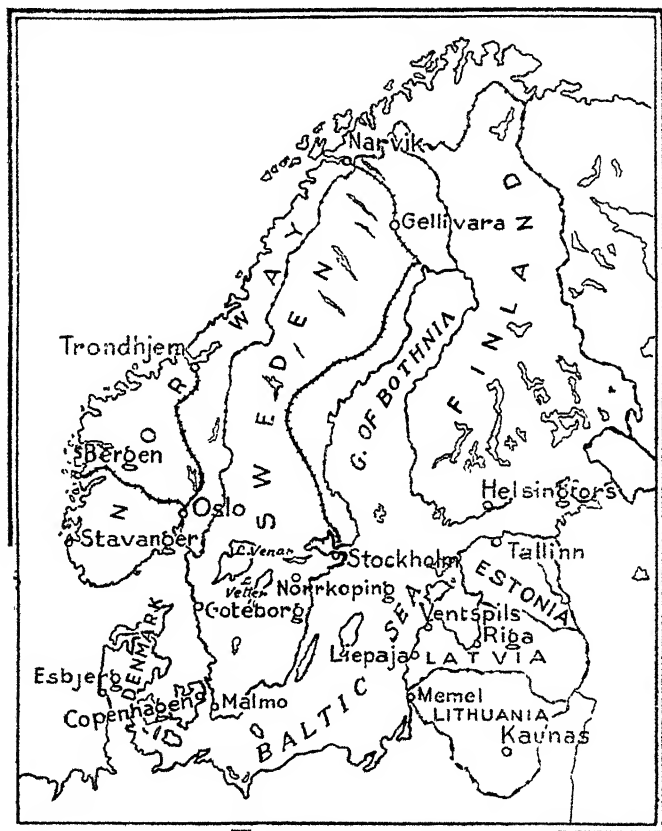
Extent and Physical Features.

ancient hard rocks similar to those of the Scottish Highlands. The slope of the land is naturally to the south-east. The warm North Atlantic Drift flows close to the western shores, and the peninsula lies in the path of the Westerlies. Thus the western shores as far even as the North Cape within the Arctic Circle remain ice-free all the year round ; and there is a fairly heavy rainfall throughout the year especially in the mountainous west. The larger rivers flow south-east because of the general slope of the peninsula ; and the mountains of Scandinavia being much loftier than those of Scotland, run swiftly down great heights, enabling them to be harnessed for electricity. The peninsula is divided between the two countries of Norway and Sweden. Climate.

NORWAY lies west of the mountain divide, and is much more fjorded and mountainous than Sweden. It has an area of about 125,000 sq. miles, and a population of 3,278,000. Owing to heavy precipitation the mountains are often covered with *forests*, which, together with the *fisheries*, constitute the principal source of the national wealth. Fishing is the most important industry. The principal catches are *Cod* and *Herrings*. Fisheries are mainly in in-shore waters and little part is taken in the North Sea fisheries. Trondjhem and Bergen are the leading fish ports. More than 50 per cent of the total area is waste land covered by mountains, 25 per cent by forests, and less than 10 per cent classed as arable, and only 4 per cent of the total area is actually under crops. The leading crops are *oats* and *barley*, and in general, other crops are much the same as in Great Britain. About 2½ per cent of the forests are reserved by the Government. Norway is poor in mineral resources. There is no coal. But she has large reserves of low-grade *iron* and a limited supply of high-grade iron ores at Kragerö and Arendale. Perhaps the most valuable sources of her mineral wealth are the *copper* mines at Røros in the Glommen River Valley and at Sulitjelma and other places. There are *silver* deposits at Konisberg near Oslo. *Silica* and *apatite* are abundant near Stavanger. There is a refinery for *nickel* ores at Kristiansand. Some *sulphur* is also exported, and there is a fairly Extent
Fishing
Agriculture
Mineral Resource

large export of granite and other stones. But poor as she is in mineral resources, Norway has almost unlimited water-power. Of the available total estimated at 9.5 millions of horse-power, only 3.1 millions have been developed. These have been largely developed by foreign capital, and many

Industries



A General map of Scandinavia

of the manufacturing industries of Norway are in the hands of foreigners. Large-scale industries are not much developed. Copper, silver and aluminium are worked by electric furnaces. Ship-building is growing in importance. There are also chemical and paper-making industries.

The towns of Norway have already been dealt with. The country lacks extensive railways, because of the mountainous nature of the surface. With the exception of the railway to Narvik, all the lines are in the south, connecting Oslo with Bergen and Trondjhem. Transport.

Spitsbergen and **Bear Island** in the Arctic circle are the only foreign possessions of Norway. Recently, however, *coal* has been discovered there.

SWEDEN, with a total area of 173,000 sq. miles, is larger than Norway, and supports more than double (7,042,000) the population of the latter. It is on the broader slope of the Scandinavian Peninsula, and comprises a considerable portion of the Great European Plain in the south. The northern half or two-thirds of the country is covered with *forests*, where lumbering is the dominant occupation of the people ; but Southern Sweden is essentially an agricultural country. More than 12 per cent of the total area of Sweden is actually under crops. But the climate of the south is of the continental type, too cold for wheat, and so the leading crops are *oats* and *rye*. Much *hay* and *fodder* for the cattle are also grown in this region. On the shores of the Baltic there are many saw-mill towns, to which timber from the northern forests are floated down the numerous mountain streams. Sweden is fairly rich in mineral resources : there are deposits of very high grade *iron* ore in Damemora and Gellivara, whence large quantities are exported to Germany, Britain, Belgium and other countries. The existence of iron ore of good quality has given rise to an important iron and steel industry with the aid of cheap hydro-electricity. The chief centres are at Stockholm and Norköping. Dairy farming is important in the south ; and so are the manufactures of paper, electrical machinery and matches. There are textile mills at **Norköping**. The capital, **Stockholm**, is also a great port. From Sweden the chief exports are iron ore, wood pulp and paper, timber, metal goods, etc., and the imports consist mainly of wheat and flour, textiles, coal, petroleum and machinery. Extent and character-istics.
Agriculture.
Minerals and Industries.
Trade.

THE GREAT EUROPEAN PLAIN

Position &
Size.

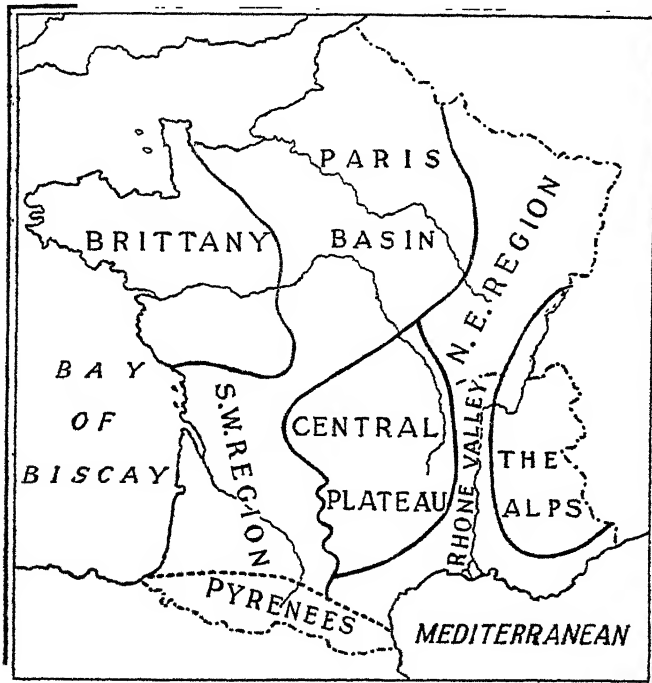
Advantages
& dis-
advantages
thereof.

FRANCE comprises an area of 213,000 sq. miles, with a population (in 1946) of 40,500,000. Her geographical position, is in many respects, unique in Europe : she has a long coast-line along the English Channel facing Great Britain ; another long coast-line along the Bay of Biscay faces the New World across the Atlantic ; and she shares a considerable portion of the coast-line along the Mediterranean Sea. France thus possesses certain unique advantages for maritime development ; and she, too, is, like Great Britain, the mistress of a fairly vast overseas dominion, which—and that is the most characteristic point about it—is comparable in variety and extent with the still vaster empire created by Great Britain. In some respects, however, France enjoys far greater advantages of situation than does Great Britain : she is continuous with the rest of Europe, and has benefitted (and also been handicapped) more by the heritage of ancient Roman civilisation. Space does not permit any analysis of such facts here. But it is obvious that these have never proved to be quite unmixed blessings ; her contiguity with all the strong and warring nations of Europe has always involved her in the whirlwind of European politics, while Britain's comparative isolation has left her hands free for overseas expansion. From a strictly geographical point of view, however, the disadvantages of her land frontier far outweigh its advantages : the lofty and difficult Pyrenees stand in the way of communication between France and Spain ; the great Alps form the boundary between France and Italy, rendering communication between the two countries difficult ; so it is between France and Switzerland ; and even between France and Germany on the one hand, and between France and Belgium on the other, the frontiers are ill-defined, and have been the occasion of many a bitter struggle.

Physical
Features.

The physical Regions of France are shown in the accompanying map. *The Central plateau* is a well-marked unit. This region is rich in mineral wealth. The important

coal-fields of this area, are situated round St. Etienne. Iron-ore is found in this region but the present output is inconsiderable. The massif is mainly composed of Archaen rocks. Therefore the soil is not very fertile. The chief crop produced is rye. Wheat and oats are grown in such favoured localities as the valley of the Allier. Pastoral farming is also extensively carried on in this region. The

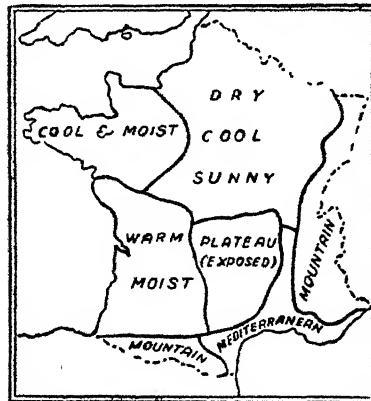


The Physical Regions of France

Armorican Massif or Brittany in the north-west consists mainly of primary rocks. The uplands separate three low land districts. The uplands are absolutely unproductive. The *S. W. Region* is a lowland, surrounded by the Central Plateau, the Armorican Massif and the Pyrenees. The character of the soil is very variable. Agriculture is the chief occupation here. Wheat, maize and vine constitute

chief products. The *S. E. regions* are in the Mediterranean area. Between the Alps and the Central Plateau is the fertile *Rhone Valley*. The vegetable products are distinctly of the Mediterranean type including olive, vine and mulberries. Wheat is the important cereal grown. *The Alpine Zone* plays but a relatively small part in the economic life of France. The soil is usually poor and unproductive. Anthracite coal and iron occur in places. *The Paris Basin* lies between the Central Massif, Ardennes and the Armorican region. This is the greatest agricultural region of France. Wheat, oats, sugar-beet, and vine are the most important products. It is also the most industrially developed region of France. *The Plateau of Lorraine* is noted for its mineral wealth. This region has important deposits of iron and coal and important metallurgical industries have developed on the ore-fields.

Climate—Generally speaking, France enjoys a marine

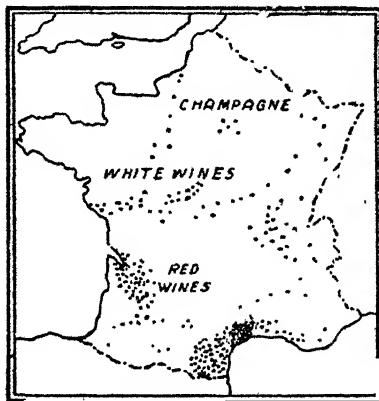


Climate.

The Climatic Regions of France
evident from the accompanying map. The greater part of the country, except the Mediterranean region, enjoys rainfall throughout the year with a summer maximum. The higher parts have the greatest precipitation and it decreases progressively from west to east.

¹ Macfarlane, Economic Geography, p. 101.

The natural vegetation of France is forest, which covers about 20 per cent of the total area ; and forestry is quite important in the country. Moorland covers some 10 per cent of the surface. And as much as two-thirds of the whole area is under tillage. France is primarily an agricultural country although she has a fairly important world position as a manufacturing country. The principal crops are *wheat, oats, maize*, and a great variety of *fruits*.



Vegetation

Agriculture

The Vineyards of France

Agricultural Products of France

Crops	Area (1,000 hectares)	Produce (1,000 metric quintals)
	1950	1950
Wheat	4,272	73,000
Mixed corn.	40	400
Rye	498	5,900
Barley	959	15,700
Oats	2,300	32,200
Potatoes	980	129,300
Industrial Beet	389	131,484

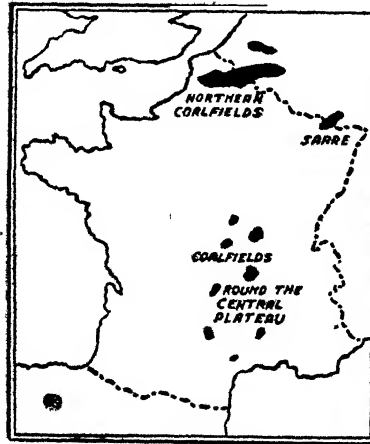
Wheat is naturally concentrated in the Paris Basin, where the climate is 'dry, cool and sunny' ; and if Russia is excluded, France alone produces a quarter of the wheat of Europe, although she has got to import a small amount of wheat now. Oats are grown chiefly in the 'warm moist' south-west. The diversity of France's climate is easily reflected in the great variety of the fruits grown : apples

Animals.

and cherries flourish in the Paris Basin ; the olive in the Mediterranean region ; and grapes—most important of all—in the south. France is the largest producer of wine in the world. Though not noted for animal products like Argentina, Uruguay, etc. the climate and soil of France are suitable for dairy cattle, rather than for sheep. The number of cattle, horses and pigs is said to be double that of Britain, but that of sheep is half. French fisheries in both the Atlantic and the Mediterranean are also of some importance.

Minerals

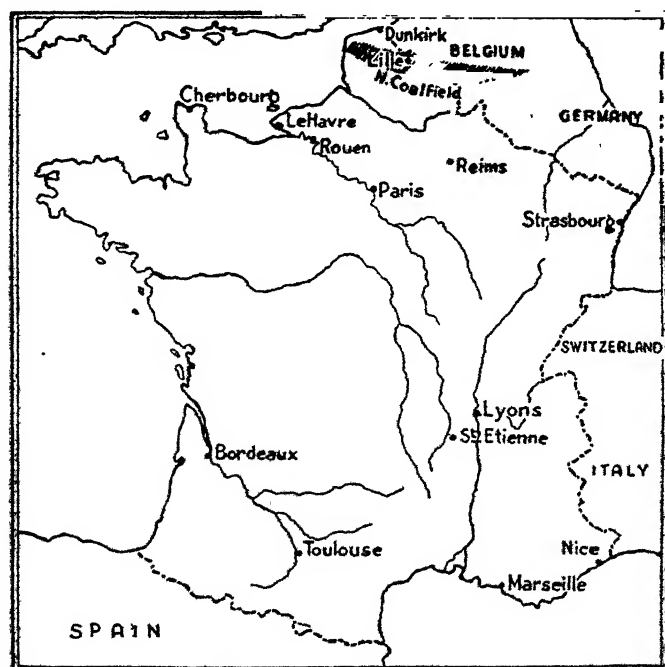
France is, however, not rich in minerals—generally speaking. But the *coalfield* of Northern France is very important, and geologists are of opinion that this field is connected under the Straits of Dover with the coalfield of East Kent in England on the one hand, and with the coal-field of Belgium on the other. There are very small coal-fields in the Central Plateau Region. The Saar coal-field is on the German border. Home supply of coal being insufficient for her requirements,



The Coalfields of France.

large quantities have to be imported from abroad, particularly from Britain and America. But France is rich in *iron* ore, though the bulk of the local supply is of poor quality, and France buys coke from Germany or Belgium chiefly for the smelting of her iron ores. The largest iron-field is in Lorraine. There are other deposits near Le Creusot and in Normandy, near Caen, as well as in various other places such as the eastern Pyrenees and Canigou. Other minerals include a small amount of *petroleum* and large quantities of *potash salt*, both obtained mainly from the Alsace region. France's poverty in coal and her wealth of potential water-power

have impelled her to develop *hydro-electricity* playfully called 'white coal.' She has abundant reserves of water-power in several areas, particularly in the regions of the Alps, the Pyrenees and the Cevennes. Even main-line railway trains are now being driven by electricity in many places, particularly in the south ; and there is a plan to use electricity throughout the French railway systems. The localisation of French manufacturing industries has been governed more by the facilities for obtaining raw materials, both from local and foreign sources, and the conveniences for marketing the products than by the supply of fuel.



The Industrial Regions of France

In France, industry is still secondary in importance to agriculture. The principal industrial region lies on the north, where there are coal fields, iron and potash. This region is linked by a network of railways and canals with

the coast on the west. Two other small centres about Bordeaux and Nantes have been developing rather rapidly since the war. The industrial areas of the south-east at the margin of the central plateau are close to the coal deposits as well as to water power. Marseilles imports much coal from England.

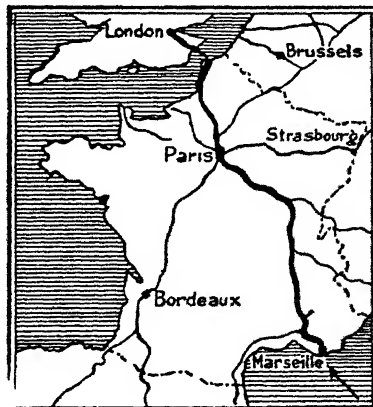
Textiles and clothing constitute the leading industry of France. France now ranks first in silk and third in cotton and wool manufactures among the European countries. Lille, Roubaix, and Tourcoing are the important spinning towns. In St. Quentin and Amiens various cotton goods are manufactured. Rouen through which port raw cotton was first imported, has now grown up as a big centre of cotton industry, though it is handicapped by the absence of coal. Other centres near it are Daretal, Maronme, Sotteville and Oissel. Another big centre of the cotton industry in the country is found around the Vosges. The river which flow from the Vosges provide not only hydro-electricity but also pure water for finishing and bleaching purposes. Mulhouse, St. Dié, Epinal and Senones are the important centres here. The woollen industry also has its principal home near the coalfields in the north. The raw material is imported through Dunkirk from Great Britain and countries of the southern hemisphere. The chief manufacturing towns are Roubaix, Tourcoing and Fourmies. France has a good reputation for its woollens and dress materials. The silk industry is located in the Rhone Valley in the South where Lyons is the most important centre. Mediterranean France, has long been a producer of raw silk but domestic supply is now far short of the demand (about 5%) and large quantities are imported from Italy and the Far East. Important centres of Linen industry are Lille and Cambrai. The largest Rayon manufacturing centre is situated near Calais.

The iron and steel industry which is second in importance to the Textile industry, is located in the eastern part of the Northern Industrial zone. Valenciennes, the most important centre, receives some ore from Lorraine and some from overseas. At Lille the manufacture of textile

machinery and general engineering are important industries. In Normandy in north-east a large-scale iron and steel industry is situated at Caen which uses local iron ore. Further south to the north-west of St. Nazaire, iron ore is also worked but to a much less extent. St. Nazaire is also an important shipbuilding centre in France. Small quantities of iron and coal are found in the Central plateau where Le Creusot, St. Etienne, St. Chamond and other towns are all engaged in the production of iron and steel. Le Creusot has also a large ordnance factory. Automobiles are manufactured at Paris, Lyons and St. Etienne.

Soaps, chemicals and candles are manufactured at Marseilles. Chemical fertilisers are manufactured in the Alsace region where large deposits of potash and water power are available. Angouleme and Annonay are noted for paper manufacturing. Besancon makes watches and Grenoble manufactures kid gloves.

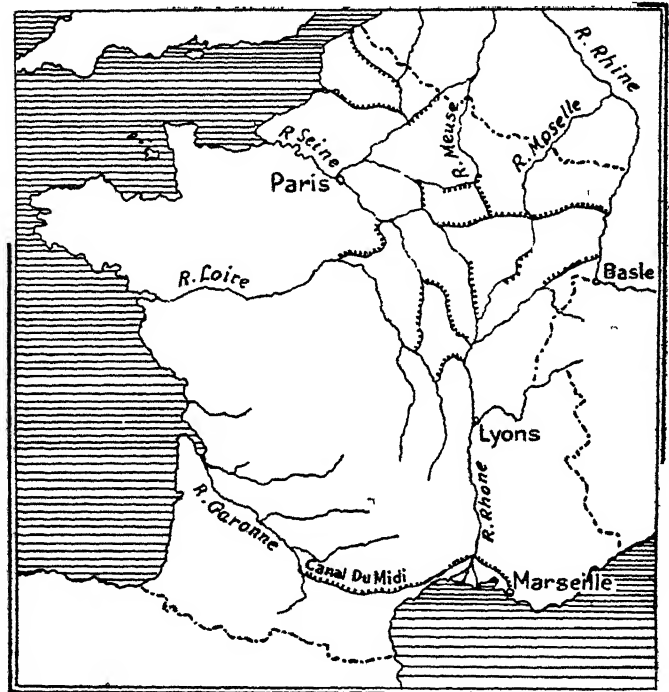
France is very well served by roads and railways. Her road and railway systems centre on Paris. But perhaps the most characteristic feature of the inland communication of France is furnished by the splendid network of waterways. We have already seen that all the larger rivers of France—the Seine, Loire, Rhone—as well as their chief tributaries are generally navigable for long distances; these are now connected by a most complicated system of canals, and it is now possible to travel from the Mediterranean Sea to the English Channel entirely by water. The principal canals



The Major Railways of France

possible to travel from the Mediterranean Sea to the English Channel entirely by water. The principal canals

are : (a) *The Marne and Rhine Canal*, which connects the navigation of the Rhine with that of the Seine, and both of these with the Saar navigation by means of a northerly branch ; (b) *The Burgundy Canal*, connecting the navigation of the Seine and Rhone through the Yonne and Saône ; (c) *The Canal du Centre*, connecting the Saône with the Loire ; (d) *The Rhone and Rhine Canal*,



The Inland Waterways of France

connecting those two rivers through the Saône ; (e) *The Canal du Midi*, connecting the Garonne with the Mediterranean Sea and thus establishing direct communication between the Mediterranean and the Bay of Biscay ; and (f) *The Marseilles-Rhone Canal*, which passes through a tunnel nearly 5 miles long.

Commerce. Manufactured goods take the leading place in the export list, particularly silk manufactures,

which normally stand first, followed by chemical products, cotton textile, metal goods, articles of clothing, pig iron and steel, motor cars, woollen goods, wine and medicines and drugs. The imports are mainly of coal, petroleum, raw cotton, cereals, oilseeds and rubber. France has a considerable amount of mercantile marine. The French also have large amounts of capital invested abroad.

Imports
and
Exports.

BELGIUM is quite a small country, less than 12,000 sq. miles in area ; but it supports a population of nearly 8 millions. Though so small, it is easily divisible into three distinct parts : (a) *The Ardennes Region* in the south is formed by a plateau, covered partly with sheep pastures and partly with forests yielding valuable pine. An extension of the Luxemburg **ironfields** penetrates into this region from the south ; and Belgium's output of iron is nearly a quarter of that of the United Kingdom. (b) *The coalfield Region*, bordering the Ardennes on the north, runs right across the country from west to east. It is a continuation of the great coalfield that stretches from East Kent through Northern France to the eastern borders of Belgium. Naturally, therefore, it is the great manufacturing region of Belgium, supporting, as it does, the bulk of the population. Belgium's output of coal is about $\frac{1}{8}$ th of that of the British Isles. Here are situated her chief industrial towns **Mons, Charleroi, Namur, and Liege**. These are all coal towns ; but Charleroi is concerned with glass and chemical industries as well, and there are railway works at Liège. Much of the iron required for her industries is brought from Luxemburg, and zinc ores are found in the east. (c) *Northern Belgium*, however, is, in the main, an agricultural country, and belongs more particularly to the Great European Plain. The chief crops, more or less in the order of their importance, are *rye, oats, wheat, potatoes, sugar-beet, and flax*. The land is not very fertile, and in the east especially it is of little use. A fairly large number of cattle are also kept in this region. Belgium has a second source of coal in the *Campine Coal-field*, lying in this region. **Brussels**, the capital and largest city, lies in the heart of this agricultural country ; it is well served by

Natural
Regions
and
Resources.

Communi-
cations.

Foreign
trade.

Natural
Regions
and
Resources

railways, and has too many industries to be particularly associated with any, except perhaps the manufacture of lace. And here in this region lies the chief spinning and weaving towns of Belgium, such as **Ghent**, **Tournai**, and **Courtrai**, all situated in or near the flax-growing region. Ghent is the principal seat of Belgium's cotton manufactures as well. The principal seat of her woollen industry, **Verviers**, however, is near the Ardennes. The ports of Belgium have already been dealt with. An industrial country like Belgium must naturally be well served by railways. The principal inland waterway is the River Meuse. The foreign trade of Belgium, however, shows an adverse balance. The principal exports of Belgium are mainly manufactured goods—machinery, metallurgical goods, cement, zinc, glass, textiles and chemical products. The imports consist of food-stuffs and raw materials.

HOLLAND is a little larger than Belgium, and has about the same number of people. The country is a flat level plain, and indeed a considerable portion of it lies below sea-level; hence the characteristic name of the **Netherlands**. The coasts are not fiorded, but the country has a long and varied coastline. Although a level plain, it falls into two divisions: (a) *The Eastern Region* is contiguous with the plain of Northern Germany; the soil is poor and largely covered with forests. (b) *The Western Region* is largely formed by the Delta of the Rhine and the Meuse (Maas). This is the more characteristic region of Holland; for a large part of it is below sea-level and consists of reclaimed submerged land. Great dykes have been constructed to keep out the sea. There has been a big project in hand to reclaim the shallow *Zuider Zee*. Although a neighbour of Belgium, Holland is essentially an agricultural and pastoral country. There are large fertile alluviums here and there. The chief agricultural products are *oats*, *rye*, *wheat*, *barley*, *potatoes*, and *sugar-beet*. Large areas are under *grass*, and cattle farming is important. Large quantities of *butter* and *cheese* are exported and there is also a considerable export of *beet-sugar*. *Fishing* is also important, especially in the islands of the north. An

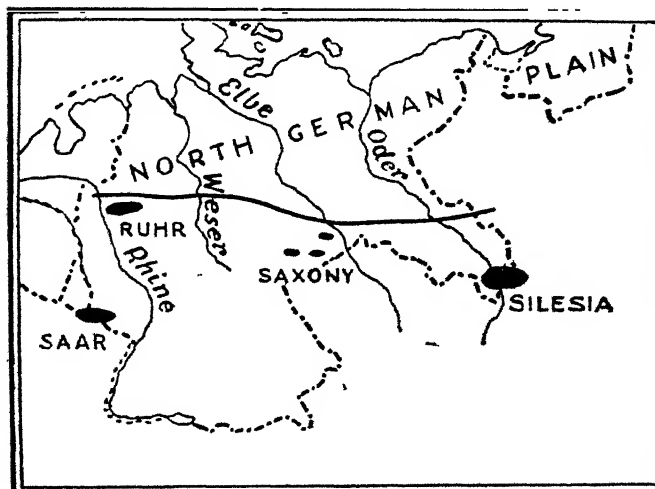
extension of the **Campine Coalfield** lies in the south-east of Holland, and the present out-put of coal is said to be nearly half that of Belgium. Holland has always been famous for her wind-mills ; for the country lies in the path of Westerlies. And despite the introduction of electric power, many of her factories and flour mills are worked by wind-power. **The Hague** is the capital of the country ^{Towns.} as well as the seat of the International Court. But **Amsterdam**, the centre of the diamond trade of the world, and **Rotterdam**, the largest port of Holland, are larger towns. Rotterdam has distilling factories. **Utrecht** is the chief seat of the cotton industry ; **Arnhem** the chief seat of inland trade. **Haarlem** has flax manufactures and is also noted for trade in flowers. **Groningen** is a centre of the butter trade. **Flushing** and the **Hook of Holland** are minor ports. (For other ports see chap. VII) Holland has ^{Communications.} through railway communication with Germany, and the country is well served by rivers and canals. The chief exports of Holland are dairy products, textiles and coal. The imports consist of machinery, iron and steel goods, ^{Trade.} raw cotton, wheat and flour, mineral oil and coffee.

DENMARK, though outside the Scandinavian Peninsula, is often classed as Scandinavian country. Actually it consists of the peninsula of Jutland and a number of ^{Character-} islands lying between the two peninsulas of Jutland and ^{istics.} Scandinavia. The country has an area of 16,576 sq. miles and the total population amounts to four millions. Geographically the whole of Denmark is only an offshoot of the Great Plain of Europe, and has no similarity either in surface relief or in geological structure with the mountainous Scandinavian Peninsula. The surface of the country is gently undulating rather than flat, although the land everywhere is only a few hundred feet above sea-level. Considerable tracts in the west coast are waste land, covered by sand dunes deposited by the sea ; and it has been necessary to plant stout trees in order to prevent the sand from blowing inland, especially because the country lies in the Westerly Wind Belt. The greater part of the land is under crops, and owing to the smallness of the

Products and Industries.	country intensive agriculture is practised. The soil, however, is much similar in general character to the North German Plain—poor and of glacial origin. But the highly industrious Danes have very nearly transformed the land, and the crops produced are of very good quality. The principal agricultural products are <i>wheat, oats, sugar-beet, barley, and margarine</i> . Cattle-farming and pig-rearing are scarcely less important than agriculture, and indeed from the point of view of foreign trade its importance is of the very first magnitude. With the exception of certain clays and lime-chalk, Denmark has no minerals. But there are many factories for making <i>butter</i> and <i>cheese</i> from milk, <i>sugar</i> from sugar-beet, <i>beer</i> from barley and oats and a few other products of a like nature. And what is more interesting still is the 'import' of electric power from Sweden for industrial purposes. The <i>fisheries</i> on the shallow west coast are important, and there are 'nurseries' for fish especially in the Lim Fjord. The capital and chief port is
Towns.	Copenhagen or Kjobenhavn. Esberg is the chief west coast port and fishing centre. Aarhus and Aalborg are the chief ports on the east of Jutland, and Odense is the chief port of Fyen. There are railways connecting
Communi- cations.	all the important centres ; but the most interesting system of communication is that of train ferries, and it is now possible to travel from Copenhagen to Berlin by these. Denmark has been linking up her railways by enormous bridges across the narrow fjords and straits. Denmark's exports consist almost entirely of butter, cheese, bacon, eggs and live-stock. The principal imports are of textiles and other manufactured foods, coal and food-stuffs.

Position and Extent.	GERMANY. North Germany is a part of the Great European Plain, while in the south it covers a considerable tract of the mountainous region of Central Europe. On the east and west, however, her boundaries are scarcely defined by geographical limits, except for the river Rhine which roughly defines the borders between Germany and France. Germany thus falls into two broad physical divisions :
Natural Regions.	(a) <i>The North German Plain</i> and (b) <i>The Southern Highlands</i> . In contrast to France and the British Isles, Germany

has a very short coastline, only along the Baltic and the North Sea. The climatic conditions of Germany are marked by some degree of continentality as is only natural owing to her more or less central position on the mainland of Europe. Nearly 33 per cent. of the total area is covered by forests, yielding a considerable output of softwoods ; about 17 per cent. classed as pastures ; and roughly 45 per cent. as arable land ; thus leaving only about 5 per cent. of the land as waste. This agreeable state of affairs speaks well of the industrious nature of the German people ; for the soil is not naturally so fertile as it might appear from this



The Physical Divisions and Coalfields of Germany.

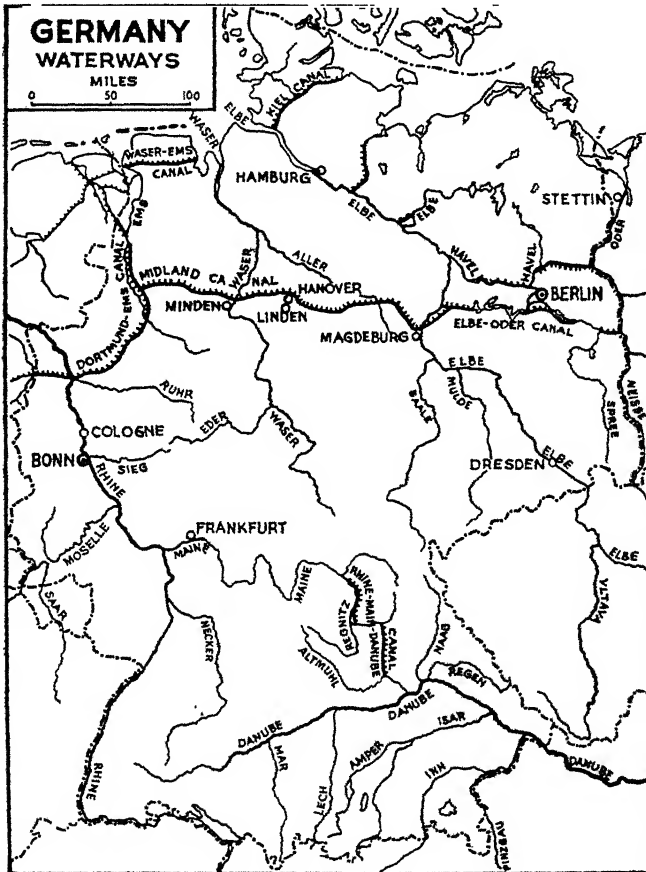
account. The Northern Plain has, on the whole, an indifferent soil, which the Germans have made good use of by planting *potatoes*, one of the chief sources of industrial Products. alcohol. The leading cereal in Northern Germany, however, is *rye*, which furnishes another point of evidence as to the poor quality of the soil. Next to rye *oats* occupy the largest acreage in northern Germany. But *wheat* and *barley* are cultivated principally in the mountainous south, where the soil is generally better and the climatic conditions much more varied because of variations in the aspect of

Minerals

individual mountain slopes and valleys. And one of the most important crops of Germany is the *sugar-beet*. But strange as it may seem, *hay* occupies the largest acreage in Germany with about 33 per cent. of the total arable land under it ; and this may be attributed to the large number of cattle reared in the country. But the number of sheep is small, comparatively speaking. Germany has big interests in the North Sea fisheries. The mineral output of Germany is quite considerable, and in all probability she is second only to Great Britain in the total value of her mineral output. Her **coal** reserves are large, and the annual production of coal, including also brown coal, is normally about two-thirds of that of Britain. The largest coalfields is in the Ruhr district. The Upper Silesian coalfield also belongs wholly to Germany now. There are smaller coalfields in Saxony. The next most important mineral is **iron**, obtained mainly from the mines of Lorraine. There are smaller iron-fields in the valley of the Sieg, a tributary of the Rhine. But the output is not sufficient for her own requirements, and Germany has to import large quantities of iron ore from Spain and Sweden. From Southern Germany—especially from Silesia—are obtained **lead**, **zinc**, and **copper**, which are often found in association. Huge quantities of **potash salts** are obtained from Saxony. Before the last Great War (1939-45) Germany was the most highly industrialised country of Europe. Fifty per cent., of the employed population was engaged in industry and commerce and only thirty per cent., in agriculture. This industrial development was due to the large resources of coal, iron ore and common and potash salts. Germany's salt deposits enabled Germany to hold the leading position in the *Chemical industry* in Europe till 1939. As regards textiles Germany's position was not so good. The *textile industries* of Germany are centred mainly in the Saxony region, particularly at **Chemnitz**, **Zwickau** and **Leipzig**. **Dresden**, lying in this region, is however, famous for articles of porcelain and China clay. The *heavy industries* are located in two regions—Westphalia and Silesia. In the Westphalian region are the great industrial towns of **Essen**, **Dusseldorf** and **Duisburg**,

Industries.

noted for the basic industries of iron and steel manufacture ; the town of **Solingen**, specialising in cutlery ; and the lesser industrial towns of Crefeld, Munchen-Gladbach, and Aachen. The town of **Cologne**, however, carries on various industries. The other region of heavy industries is in Silesia. The ports of Germany have already been dealt with



The Inland Waterways of Germany.

(Chap. VII). The railways of Germany naturally centre on Berlin, the capital. And like France, Germany has made extensive use of inland waterways. All the great rivers—communications.

the Rhine, the Elbe, the Oder—are now navigable up to the German frontiers and often beyond them. These rivers have all been canalized and interlinked by means of excellent canals, and the inland waterways system of Germany now centres on Berlin. The *Dortmund-Ems Canal* links Emden with Dortmund, and unites with the Rhine navigation, linking up Strasbourg, Frankfurt, and Cologne with Rotterdam. An easterly branch from the Dortmund-Ems Canal crosses River Weser and unites with the Elbe, linking Minden, Linden, Hanover, and Magdeburg. The Elbe links Cuxhaven, Hamburg, Dresden, and Prague, and the whole line is linked in the north with Kiel through the famous *Kiel Canal* (a ship canal), and with Berlin in the centre by means of various branches. The Oder links up Stettin, Breslau, and Kosel, and of course Berlin. The *Oder-Vistula Canal* links up Berlin with Danzig. The total length of inland waterways is upwards of 7,500 miles.

Foreign Trade.

Pre-war Germany was mainly an exporter of manufactured goods and importer of raw-materials and food-stuffs. 80 per cent. of her exports consisted of manufactures. The principal exports were iron and steel goods, textiles, coal, chemicals and drugs, paper, copper goods, glassware and stationery. The only agricultural product exported was sugar. The imports were coffee, butter, wheat, cotton, wool, petroleum, iron-ore, copper and timber.

Position.

POLAND for the most part lies in the Great European Plain, but stretches from the Baltic Sea to the Carpathian Mountains. Her only natural frontiers, if she has any, are, therefore, in the south ; on all other sides she marches with neighbouring Powers, particularly with Germany on the one hand and with Russia on the other. Extensive marshes alone intervene between the main territory of Poland and Germany on the west, and between Poland and Russia on the east. Poland is transitional between an agricultural Eastern Europe and an industrial Western Europe, though if the efforts of Russia meet with success the contrast will be reduced. The country naturally falls into two broad divisions : (a) *Northern Poland* or the *Plain of the Vistula River*, and (b) *Southern Poland* or *Galicia*. The

Regions.

climate is of the continental type because of the country's situation in the heart of Europe, and consequently the



A General Map of Poland

rivers are frozen for a considerable part of the year. Northern Poland or the Plain of the Vistula, which occupies the greater part of the country, resembles the North German Plain in general characteristics ; large areas are covered with forests and marshes such as the Poznan or Posen marshes on the German border, and the Pripyet Products. marshes on the Russian border. Economically this is essentially an agricultural country. The climate, however, is too severe for wheat, and the principal crops are *rye*, *oats*, *barley*, *potatoes*, *sugar-beet* and *flax*. Cattle farming and the rearing of pigs are important. Southern Poland or

Minerals
and
Industries

Galicja, which comprises the forested slopes of the Carpathians, is pre-eminently a mining region : there are rich **oilfields** in the sub-Carpathian Belt, especially at Boryslaw (near Lwow), and very important **salt** deposits near Kracow. Farther east there is the great **Silesian Coalfield**, believed to be the richest coalfield in Europe ; two-thirds of this coalfield lies within the boundaries of Poland. The capital of Poland is **Warszawa** (Warsaw), on the Vistula. It is in Northern Poland and occupies the heart of the country. It is also an important railway centre, controlling, as it does, the routes between Russia and Germany. It is also a manufacturing centre with iron, steel, textile, and leather industries. **Lodz**, an important seat of cotton manufactures, lies south of Warsaw. **Lublin** is also an important town of Northern Poland. In Southern Poland lie **Lwow** (or Lvov or Lemberg) and **Kracow** (or Cracow). The principal items of export from Poland are *coal, timber, dairy produce, meat, eggs, pigs, and agricultural produce* (grains and sugar) and *zinc and petroleum*. *Textiles* are the most important of the manufactured goods exported. The imports are mainly manufactured goods and raw materials.

Trade

THE BALTIC STATES

Position.

FINLAND, or **SUOMI**, as it is called by its own people, lies east of Sweden. It is often described, and rightly enough, as 'the country of ten thousand lakes'. For its latitude the climate is mild and warm. Its short Arctic shores remain open even in winter, although, strangely, rather the southern and western shores, save only the south western extremity in the region of the port of **Hango**, are blocked by ice in winter. More than 75 per cent. of the total area is under forest, and about 80 or 85 per cent. of the country's exports consist of *timber, wood-pulp, and paper*. The leading crops are *barley, oats, and hay*, and it is said that these can be cultivated "well within the Arctic Circle." Cattle are kept, and there is a small

export of *butter*. The capital and chief port is **Helsinki** (formerly, **Helsingfors**). **Abo** (*Turku*) is another port of some importance. The principal means of inland communication are the lakes, many of which are linked by canals. **Lapland** is in the north of Finland. The Lapps are a nomadic people, depending as they do, mainly on their herds of reindeer.

ESTONIA lies south of the Gulf of Finland. Geographically, it is a part of the great Russian Plain. Position Nearly 75 per cent., of the total area is forested, and the ^{and} remainder is devoted partly to crops and partly to pasturage. Character-istics. Agriculture and dairy farming are the chief occupations of the people. The climate is too cold for wheat, and the principal food crops are *rye*, *oats*, *barley*, and *potatoes*; some *flax* is grown and exported, but the main items of export are *timber* and *paper*. The capital and chief port is **Tallin** or **Reval**. Estonia and Finland hold, between them, the key to the entrance to Leningrad and the adjoining tracts of Russia, and that country's sudden intrusion into them at the outbreak of the last hostilities in Europe was prompted by a desire to secure her western frontiers. The whole of Estonia and a considerable portion of southern Finland have now been incorporated into the U. S. S. R.

LATVIA, lying south of Estonia, is also a part of the Russian Plain. In climate, products, and occupations Position of the people it closely resembles Estonia; but the export ^{and} of *flax* is perhaps more important than that of *timber*. Character-istics. The capital and chief port is **Riga**, and it is actually the frontier town between Western Europe and the U. S. S. R., and it is here that the railways from Western Europe and the U. S. S. R.—both the systems being on different gauges—terminate. But the Gulf of Riga is blocked by ice in winter, rendering the capital useless as a port for several months of the year. The ports of **Libau** and **Ventspils** (Windau), however, remain open nearly all the year. The republic of Latvia was incorporated into the U. S. S. R. at the outbreak of European hostilities.

Position
and
Character-
istics.

LITHUANIA lies south of Latvia, and agrees with it in general characteristics. Besides *timber* and *flax*, *dairy produce* forms an important item of export. The republic is distinctly handicapped by the shortness of its coast-line. The capital is **Kaunas** or **Kovno**, and **Memel** the only port.

MEDITERRANEAN EUROPE

Physical
features.

Climate.

Vegetation.

The **Peninsula of Iberia** is the westernmost of the three large peninsulas of Southern Europe. It comprises the two republics of **Portugal** and **Spain**. The whole peninsula is cut off from France and the rest of Europe by the lofty *Pyrenees* and consists of a high plateau, called the *Meseta*. The plateau is bounded by the *Pyrenees* and the *Cantabrian Mountains* on the north and by the *Sierra Nevada* on the south. On the south the narrow Straits of Gibraltar separate it from the continent of Africa. A number of rivers such as the Guadalquivir, Gualiana, Duro, Tagus, and Ebro cut deeply through the plateau. The northern and north-western parts of the peninsula, however, form a part of the climatic zone of North-Western Europe, and hence have rainfall all the year. The remainder of the peninsula has a Mediterranean climate. The typical vegetation of the northern and north-western parts is, therefore, deciduous forests; in the river valleys of these regions there are rich grasslands, these grasslands are eminently suitable for cattle farming. The remainder of the peninsula offers varied characteristics: the *Meseta* has a modified Mediterranean climate. In winter this region is generally too cold for Mediterranean products, except a few stretches of fertile land where wheat can be cultivated. Southern *Meseta* has a more typical Mediterranean climate; but the region is generally deficient in rainfall and so too arid commonly for agriculture. It is, therefore, largely covered by poor grassland furnishing indifferent pastures. There are small strips in this region where the climate is hot enough for rice and even for the date-palm. In the whole of Europe rice is cultivated only in Italy and Spain, and the date-palm only in the latter.

PORTUGAL with an area of 35,500 sq. miles, occupies the greater part of the West Coast of the peninsula. About 50 per cent., of the entire territory is waste land, and a considerable part of the remainder covered by oak forests. Rainfall is heaviest in the north, where the chief crop is *maize*. This is also the richest cattle farming region of the republic. The chief agricultural products of the comparatively arid south are *wheat* and *maize*; and large numbers of pigs are also reared in this region. On the mountains the only notable crop is *rye*, and large numbers of sheep and goats are kept there. But the most important of the commercial products is *wine*, which alone accounts for more than a quarter of the total value of exports. Next comes *fish*, followed by *cork*, *coal*, *fruits* and *olive oil*. Portugal alone supplies half the world's requirements of cork. **Lisbon** is the capital and chief port. **Oporto** is famous as the 'port-wine' port. **Setubal** is the chief seat of fishing industry. The foreign trade of Portugal, however, shows an adverse balance. The exports consist chiefly of wine, fish (Sardines mainly), cork, timber and fruits. The imports are wheat, machinery, textiles, coal and petroleum.

Products
and
Industries.

Towns.

SPAIN with an area of 196,607 sq. miles, occupies the greater part of the Iberian Peninsula. The country falls into several natural regions: (a) *The Northern Coastlands* are a mountainous region formed by the Cantabrian Mountains and extremely narrow and inter-cepted coastal areas. The climate is akin to that of North-Western Europe, and so the region has precipitation all the year round. This is the richest and most thickly peopled part of the country. The mountains are clothed by beautiful *pine forests*, and the region is rich in minerals, especially *coal* and *iron*. The principal food crop is *maize*, and the rich grasslands are well suited for *cattle farming*. (b) *The Central Plateau* (Meseta) occupies the greater part of the country. The climate is arid and cold, and the soil largely unsuitable for cultivation. *Wheat*, however, is the principal crop on more fertile areas. On the pastures sheep are kept and fine *wool* is obtained from them. (c) *Southern*

Natural
Regions
and
Products.

Spain, corresponding roughly with the valley of the Guadalquivir, is a sheltered and warm area. The principal products are *oranges*, *lemons*, the *vine*, *sugar-cane*, and *sugar-beet*; the last two flourish on irrigated areas. The region is also rich in minerals, especially *copper* and *iron*; copper is obtained near Huelva, and iron from the Sierra Nevada. (d) *The Mediterranean Coastlands*, however, are in the rain-shadow of the high Meseta; but the land is irrigated from the mountain streams. The principal products are the various Mediterranean fruits such as *olives*, *grapes*, *oranges*, *lemons* etc. The capital is **Madrid** in the heart of the Central Plateau. The total volume of trade is very low per head of population. The chief exports are oranges, wine, grapes, olive oil, cork, esparto grass, iron ore and copper. The imports are coal, petroleum, cotton goods, machinery etc.

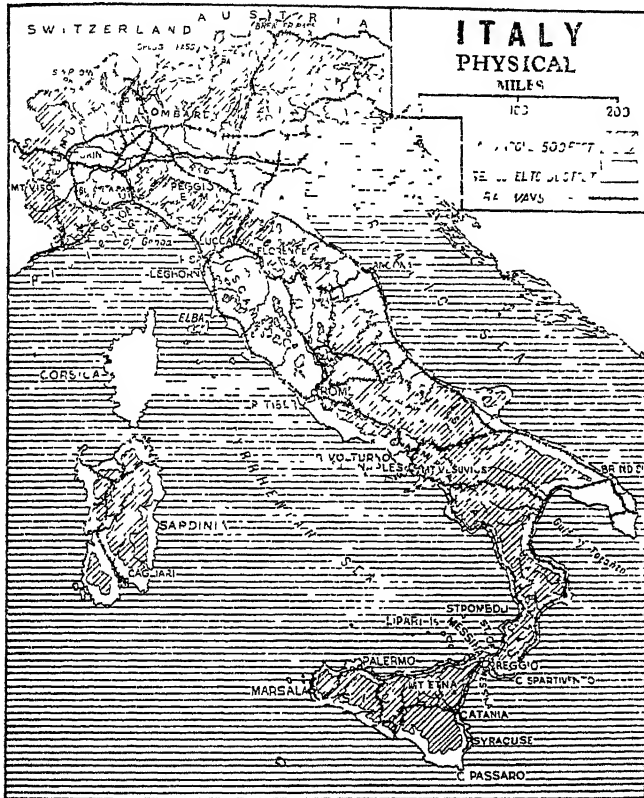
Trade.

Natural
Regions

ITALY is essentially a Mediterranean country. It is roughly of the same size as the British Isles, (120,000 sq. miles) and has about the same number of people (46 million). Physically the country falls into three broad divisions: (a) *The Alpine Region* in the north, formed by the southern slopes of the Alps and associated valleys; (b) *The Plain of Lombardy*, also in the north, formed mainly by the great Basin of the Po; and (c) *Peninsular Italy*, down which runs the mountain backbone of the Apennines. These divisions correspond with the principal climatic zones. The Alpine Region is not totally cut off from Mediterranean influences because of the general west-to-east alignment of the valleys. But the Plain of the Lombardy is cut off from them by the mountain spurs of the Apennines, with the result that in the cold season it is often below freezing point there, but very hot in summer. The climate of Peninsular Italy is, of course, typically Mediterranean, and warmer and damper than that of the rest of the country. Nearly 20 per cent., of the total area of Italy is classed as woodland and forest, another 20 per cent., covered by rough pastures, and the bulk of the remainder cultivable. The chief crop is *wheat*; but Italian wheat is generally hard. Other agricultural products

Products.

include *oats, maize, rice, olives, vines, and lemons*—the last especially in the island of Sicily. Asses and mules perhaps



Natural Regions of Italy

outnumber other domestic animals in Italy; they are more Animals. important as transport animals than horses in Southern Europe. Goats, again, far outnumber the sheep. Italy is poor in minerals; having no coal and oil she naturally lacks the essential basis of modern industry. The bulk of her coal requirements is purchased from Britain in times of peace; in fact, she was for many years Britain's largest customer of coal. But she has large **water-power** Water-resources, much of which has already been harnessed in power. the service of her manufacturing industries. And this has

Minerals

Industrial centres.

Trade.

naturally determined the situation of her great industrial towns such as Milan and Turin in the northern plain where water-power is easily obtained from the Alpine region. But Italy has good quality **iron** ore, though the reserves are small, in the islands of Sicily and Elba. Sicily has large deposits of **sulphur** as well; and the island of Sardinia is believed to be fairly rich in various minerals. The density of population being very high the pressure on the land is quite considerable; and she is in great difficulties as regards getting relieved of the pressure of population. Italy is still more an agricultural country than an industrial one; but she is fast becoming an industrial country. Prior to her entry into the last European War manufactures gave employment to more than four million people. The largest industrial town of Italy is perhaps **Milan**, where there are cotton and silk mills as well as machinery and railway work shops. **Turin** has also developed railway and machinery workshops. There are cotton mills in **Naples**, where sugar-refining and engineering are also rapidly becoming important. **Como** and Bergamo are also important silk-spinning towns. Woollen manufacture is also gaining in importance. The ports of Italy have already been dealt with (Chap. VII). Italy is distinctly handicapped by the scarcity of raw materials and foodstuffs. The bulk of her cotton requirements is imported from the U. S. A., and India. Other imports are coal, wool, wheat, silk, iron and steel, machinery and petroleum. The principal exports are silk and other textiles, wine, fruits and olive oil.

MALTA and **GOZO** are two islands holding the key to the route between the eastern and western regions of the Mediterranean Sea. They are in British hands, and serve as naval bases.

ALBANIA is an undeveloped mountainous country between Greece and Yugoslavia; it is inhabited by hill tribesmen. The capital is *Tirana*; and there are good natural harbours at *Durazo* (Durrës) and *Valona* (Avlona). It is now a republic.

GREECE, the forerunner of European civilisation, occupies the southern part of the Balkan Peninsula and

includes an archipelago and the large island of Crete. The **Position** total area is only 50,000 sq. miles. The country is very and rugged and mountainous, and the climate typically Eastern **Characteristics**. Mediterranean, and rainfall low. The mountains are mostly bare or covered with sparse vegetation; forests occur only in specially favoured mountain tracts. Owing to the extreme scarcity of rains it is difficult even to find sufficient water for irrigation. The settlements are therefore, concentrated in the coastal tracts, where the soil is generally of rich alluvium. The principal food grains are *wheat, barley, and maize*; no surplus is available for export. **Products**. But Greece is noted for fruits such as *olives, oranges, figs, lemons and grapes*; and *currants*, together with *tobacco*, are the staple export of the country. Sheep are reared especially in Northern Greece, and *wool* is obtained, but it does not enter into the export trade. *Honey* is obtained from Hymethus near Athens, and it often enters into foreign trade. Some minerals are available in small **Minerals**. quantities such as *iron* ore near Laurion in Attica and in the island of Seriphos, *chrome* in Thessaly, and *silver-lead* near Laurion. Greece is essentially an agricultural country, and her main industries are connected with the production of olive oil, wine, cheese, leather and soap. The capital is **Athens**, and its port is **Piraeus**. The port of **Salonica** **Towns**. serves mainly as the outlet for Yugo-Slavia, and is the chief seat of the carpet industry. **Patras** is the principal current port. **Volos** is the main outlet and inlet of Thessaly, and has been provided with a break-water. **Candia** is the principal town of Crete. The foreign trade shows an unfavourable balance; the imports being valued at twice as much as the exports. All the exports are specialised agricultural products. The imports consist mainly of grain, textiles, coal, raw cotton etc.

TURKEY now occupies a small territory in Europe around Istanbul.

CENTRAL EUROPE AND DANUBE BASIN

SWITZERLAND with an area of 15,940 sq. miles **Position**. is a small republic in the heart of the mountains of

Natural regions.	Europe, with frontiers against France, Germany, Austria, and Italy. In its physical features the country is divisible into three broad units: in the north lies a part of the <i>Jura Mountains</i> ; the southern half is formed by the principal chain of the <i>Alps</i> ; and between the two lies the <i>Swiss Plateau</i> . The country is not very fertile, but the people have made the best possible use of a bad situation. The plateau region is the most developed agriculturally, and contains the bulk of the population.' The crops are, on the whole, similar to those of the adjacent parts of France and Germany. But <i>dairy farming</i> is even more important than agriculture, and <i>cheese</i> and <i>condensed milk</i> form important items of export. The general moistness of the climate on the exposed mountainous tracts and the windward slopes encourages a luxuriant growth of pasture-grasses, and about 70 per cent., of the usable land is devoted to cattle-rearing. The cattle graze on the mountain pastures in summer, and are brought down to the valleys in winter as they become snow-covered in the cold season. About 30 per cent., of the total area, exclusive of forests and waste land, is devoted to crops
Minerals	Switzerland is poor in minerals: there is little or no coal; the output of iron , chiefly from the Gonzen mine, is quite small; so is also the case with manganese , which is also worked in the Gonzen mine. Salt is worked at Bex and elsewhere, and among other mineral products can be mentioned <i>asphalt</i> and <i>cement</i> . But Switzerland possesses large reserves of water-power , estimated at 4 million horse-power; of this total reserve about 20 per cent., has actually been developed. The development of water power has actually transformed Switzerland into a manufacturing country, and the bulk of the country's exports now consists of manufactured articles. Nearly the entire railway system of the country has now been electrified, and so have also been all the factories. But transport is expensive, and so it has been necessary for Switzerland to specialise in the manufacture of small objects—watches and clocks, scientific instruments and apparatus, jewellery, fine silk materials, fine cotton goods etc. Nearly half of the total population of 4 million is engaged in industry and commerce. The capital is Berne on the river Aar; it is one of the important seats
Water-power.	

of silk manufacture. Other seats of silk manufacture are **Zurich** and **Basle**. The famous city of **Geneva**, the headquarters of the League of Nations, specialises in the manufacture of watches and clocks. **Neuchatel** is also noted for watches and clocks. **Vevey** is a centre of the Industrial milk-tinning industry. The manufacture of textile and centres. electrical machinery is done especially at **Oerlikon** and **Baden**. The magnificent scenery of the Swiss Alps attracts tourists from all over the world. Hotel industry is of great importance in the Alpine zone. Switzerland's central position has made it the meeting place of various important routes. Berne and Vevey are connected with Milan, Venice and Trieste through the Simplon Tunnel which lies in Switzerland; another important railway tunnel is the St. Gothard. The Mont Cenis Tunnel through which runs the railway between Italy and France, and the Brenner Tunnel which connects Italy and Austria by rail are, Communi- however, outside Switzerland. Switzerland has no port and cations. no coast-line; Antwerp, therefore, serves as the principal port for export, and Rotterdam as the principal port for imported commodities. The main *items* of export are Trade. *manufactures*—watches and clocks, machinery, fine cotton and silk goods, and cheese and tinned milk. The principal items of import are *raw materials*, and *foodstuffs*—cotton, silk, wool, metals, wheat, sugar etc.

AUSTRIA is a typical Alpine area. It has an area of 32,360 sq. miles with a population of about 7 million. In many respects it is like Switzerland, and like the latter it, too, readily falls into three broad physical units: the eastern end of the Alps, known as the Tyrol, covers nearly three-quarters of the total area; then there is the valley of the Danube, which cuts through the east of the country; lastly there are the hills to the north of the Danube, resembling the Jura Mountains of Switzerland. The most populous and important part of the country naturally is the Danube Valley, where the chief crops are *wheat* and *maize*; Products. those of the Alpine region are *rye* and *oats*; but *forestry* is more important here than agriculture, and large tracts are devoted to *cattle farming*. Austria is rather rich in

Industries. minerals; there are fairly large deposits of *iron ore, lignite, lead, zinc, copper, and salt*. The principal seats of iron and steel industry are at **Steyr** and **Donawitz**. The capital is **Vienna**, the only large town in present-day Austria, situated just where the Danube leaves the Alps and enters the Hungarian Plain; all traffic between Southern Germany and the Hungarian Plain converge on it. The city was once the seat of several important industries; at present its only industry of note is that of cloth-making.

Characteristics. **HUNGARY** is a small inland country bordered by Austria on the west, Czechoslovakia on the north, Rumania on the east and Yugoslavia on the south. Nearly in all respects it is a direct antithesis to Austria; in contrast to mountainous Austria it is almost entirely a plain; whereas Austria is fairly rich in various minerals. Hungary is very poor in mineral resources except for a little coal and some lignite; the people of Hungary are quite distinct from the Austrians, who are essentially a Germanic race; the Hungarians are Magyars and said to be racially allied to such Asiatic races as the Turks. The fertile plains of Hungary were covered by beautiful grasslands; these have now yielded place to various crops—*wheat and maize* principally in the richer south, and *rye, oats and barley* in the comparatively poor (though not actually quite poor) north. Other important crops are *sugar-beet, hemp, and flax*. The country is suitable for *cattle, sheep and pigs*. The capital is **Buda-Pest**, a twin city on the Danube. **Szeged** is the chief town in the south, but it is more like an agglomeration of villages than like a town, and so are also the so-called towns of Debreczen, Kecskemet, and Szabadka.

Products. Hungary is an agricultural country, supplying the neighbouring regions with its own produce, and receiving in return such manufactured goods as clothing and textiles. Her largest customer still is Austria, where goes nearly a third of all the exports. Next comes Czechoslovakia for about a fifth of the exports. Germany probably stands third among her customers. And these three states between them supply about 55 per cent., of the imports of Hungary.

Towns.

Trade.

CZECHO-SLOVAKIA is also another 'succession History. state' which arose in 1918 largely out of the former Austro-Hungarian Empire. It was carved out as a union of the Northern Slavs. A large part of it was absorbed in the German Reich in 1938 as a result of the notorious Munich Agreement. The whole of it is now liberated. The territory includes the plateau of Bohemia known also as the Bohemia. Czech Plateau, where there are large deposits of good coal and lignite as well as some iron ores. The region is drained by the Elbe River and its tributary, the Moldau. The rich alluvium of the river valleys yields a varied harvest of *potatoes, rye, wheat, sugar-beet* and *hops*. And here also have sprung up various manufacturing industries, and the region is dotted about by cotton mills, paper mills, saw mills, glass and chemical factories, iron and steel works, etc. The capital, **Prague** (Praha), and the other important industrial town of **Pilsen** lie in this region. The Moravian Moravia. lowlands, in the centre of the country, are similar in general character to the neighbouring Hungarian Plain, and the principal products of this region are *barley, maize, sugar-beet*, and *fruits*. There are rich coalfields here also; besides in the south of the region, a part of the great **Silesian Coalfield** lies in the north. And naturally, therefore, various manufacturing industries have sprung up in this region also. The chief centre of the region for woollen goods and machinery is **Brno**. East of the Moravian Lowlands lie the Carpathian Mountains and associated valleys—a region Slovakia. often called simply Slovakia. Large areas of this region are forested, and many places are rich in minerals, but it is the least developed part of Czecho-Slovakia. The principal exports are manufactured goods like textiles, glass, iron and steel goods, coal, sugar, etc. The imports consist of raw materials and cereals.

YUGOSLAVIA is another 'succession state' that arose in 1918. It is the union of the Southern Slavs. The History. Alpine region of the country, formed by a few small spurs of the Alps, is roughly coincident with the province of Slovenia, and resembles the neighbouring state of Austria Alpine region. in general characters. The Adriatic Coast, known also as

Adriatic coast.	Dalmatia or the Dinaric region, is also mountainous, being formed largely by the Dinaric Alps. The region is generally very dry and full of limestone mountains. The principal products of the more fertile tracts of the region are Mediterranean fruits. At the junction of the Alpine region and the Dinaric region some minerals are found.
Northern Plain.	The Northern Plain of the country is actually a part of the great Hungarian Plain; it is, however, entirely cut off from Mediterranean influences, and has a continental type of climate. But the products of the naturally rich soil agree with those of Hungary, and are represented mainly by <i>wheat, maize, tobacco, and sugar-beet</i> . The Southern Region of the country is the largest natural unit, and has varied characteristics. The hills are partly forested and partly covered by pastures suitable for sheep and cattle. The sheltered valleys yield <i>wheat, maize, and fruits</i> , especially plums which form an important item of export in the dried state. The <i>vine, sugar-beet, hemp, and tobacco</i> are also grown in suitable areas. And there are, in this region, deposits of various minerals, especially of <i>iron and lead</i> . The capital is Belgrade , on the Danube; it lies at the northern end of the Southern Region. Nish is on the route to the Greek port of Salonika. On the Adriatic Coast and near the Italian port of Fiume has been built the new Yugoslav port of Susak . Farther down are the ports of Split, Dubrovnik (Ragusa), and Kotor (Cattaro). Sarajevo is an important inland town; Zagreb is the principal town of the Northern Plain. The Yugoslav ports are difficult of access, and the country's main outlets are the Greek port of Salonika on the Aegean Sea, and the Italian ports of Trieste and Fiume. The Danube, on the other hand, serves as the highway into the northern countries. The principal exports are <i>timber, fruits, animals, wheat, and maize</i> ; the principal imports, <i>manufactured goods</i> generally. The balance of foreign trade is, on the whole, favourable.
Towns	
Trade.	

RUMANIA is divided into two parts by the Carpathian Mountains and the Transylvanian Alps. The mountains are covered by forests, yielding valuable *forest*

Regions
and
Resources

products ; and along the southern foothills lie a number of rich *oilfields*, which constitute the principal source of national wealth. The country is, moreover, rich in other minerals ; for among the difficult hill region in the west are important deposits of *gold, copper, silver, lead, iron, and coal* ; but the output of minerals is small. To the south-east of the mountains lie the Wallachian Plain, formed mainly by the valley of the lower Danube. Geographically it may be regarded as a part of the steppelands of Russia. The climate is continental and the rainfall low. It has now been transformed into one of the major wheat-lands of the world. Besides *wheat*, the other crops grown are *barley, maize* and *oats*, and it is from here that the bulk of the surplus of agricultural produce is obtained for export. The capital, **Bucharest**, lies in this region. Other important ^{Towns.} towns of this region are **Galatz** and **Braila**, both river ports on the Danube. **Constantza**, on the Black Sea, is the most important port of Rumania ; it remains ice-free all the year round, and oil from the refineries at **Ploesti** is sent by pipe line to Constantza for export. The principal ^{Trade.} items of export are *wheat, maize timber, oil, and livestock* ; the principal items of import are *cotton* and *woollen goods* and *machinery*. The foreign trade has long been maintaining a favourable balance.

BULGARIA is a small mountainous country, and falls into three natural regions : (a) *The Lower Danube Valley* in the north, (b) *The Balkan Mountain* and the *Rhodope Mountains* in the centre, and (c) *The Valley of the Maritza* ^{Natural regions.} *River* in the south. It is essentially an agricultural country ; the principal crops are *wheat, maize, tobacco, sugar-beet, and fruits*. There are valuable forests of *oak* and *beech* on the mountains ; and the country owns large numbers of ^{Products.} sheep, goats, and pigs. The capital is **Sofia**. The centre of the Maritza Valley is **Philippopolis**. **Ruschuk** is a ^{Towns.} Danube port, and **Varna** the Black Sea port. The principal imports are *cotton* and *woollen goods*. The imports are ^{Trade.} generally slightly higher in value than the exports.

EASTERN EUROPE AND SIBERIA RUSSIA

The Union of Socialist Soviet Republics

Area and Population	<p>Position and Size.—The Union of Socialist Soviet Republics—an enormous territory covering an area of over $8\frac{1}{4}$ million square miles, with a population (in 1940) of 193,200,000—consists of the following <i>sixteen</i> Union Republics—<i>The Russian Soviet F. S. R. i.e.</i>, Russia proper ; <i>The Ukraine S. S. R.</i> ; <i>Belorussian S. S. R.</i> ; <i>Azerbaijan S. S. R.</i> ; <i>Georgian S. S. R.</i> ; <i>Armenian S. S. R.</i> ; <i>Turkmen S. S. R.</i> ; <i>Uzbek S. S. R.</i> ; <i>Tadzhik S. S. R.</i> ; <i>Kazakh S. S. R.</i> ; <i>Kirghiz S. S. R.</i> ; <i>Karelo-Finnish S. S. R.</i> ; <i>Moldavian S. S. R.</i> ; <i>Estonian, Latvian, and Lithuanian S. S. R.</i> After the Great War II Estonia, Latvia, Lithuania and a small fragment of Finland were incorporated in the Soviet Union. However, the U. S. S. R., is the largest compact political unit in the world. The whole of the Soviet territory lies far beyond the tropics—in the Temperate and the Frigid Zones ; and, although bordered on nearly all sides by oceans and seas, Russia has few outlets to the open ocean : the Arctic Ocean on the north allows passage only for two or three weeks in mid-summer ; the Pacific coast on the east remains ice-bound in winter ; the passage through the Black Sea, open all the year, is, however, under the control of Turkey at the Bosphorus and the Dardanelles ; on the west, Russia is guarded by Rumania, Poland, and the three small Baltic states—recently absorbed in the U. S. S. R. ; and Finland and Estonia, between them, have complete control over the entrance to and from the region of Leningrad.</p>
Position.	

Physical Features.—The enormous territory of the U. S. S. R., may be divided into the following broad physical units: (a) *The Plain of European Russia* ; this is actually the famous Russian Platform, and it occupies nearly the

whole of European Russia from the Arctic Ocean to the Black Sea on the one hand, and to the Caucasus Mountains and the Caspian Sea on the other. (b) *The Caucasus and Trans-Caucasia* form a comparatively tiny area in the southern part of European Russia. (c) *The West Siberian Lowlands* lie east of the Ural Mountains. (d) *Eastern Siberia*, bordering the West Siberian Lowlands on the east,



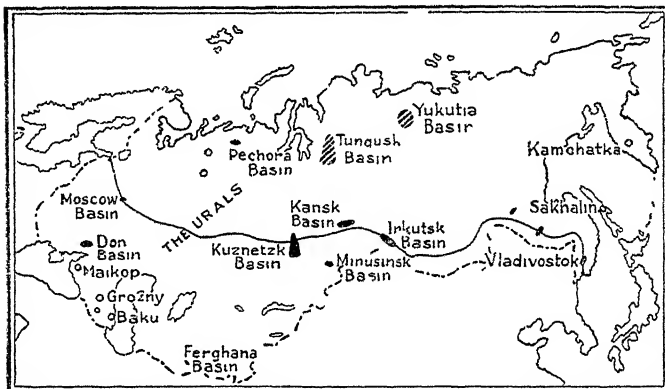
The Natural Regions of Russia

is a low dissected plateau. (e) *The Far East* consists of a succession of mountain chains. (f) *Russian Central Asia* lies east of the Caspian Sea and south of the West Siberian Lowlands ; it is bordered on the south and east by the mountains of Central Asia, and consists of steppelands.

Geology and Minerals.—Russia is enormously rich in mineral resources. The Russian Platform consists of pre-Cambrian rocks resistant to later Alpine folding, and is covered by huge deposits of later sediments. These later sediments contain large coal measures and deposits of lignite. The U. S. S. R. is said to contain about 20 per cent of the world's coal deposits. The actual production in 1950 was estimated at 264 million metric tons.¹ About 50 per cent. of this huge output comes from the Donetsk Basin or Dombas which supplies coal and coke to meta-

¹ The Statesman's year book.

lurgical and heavy industries of South European Russia. The second most important coalfield lies in Kuznetsk basin in South Western Siberia. This field contains seams of



The Coal and Oil Fields of Russia

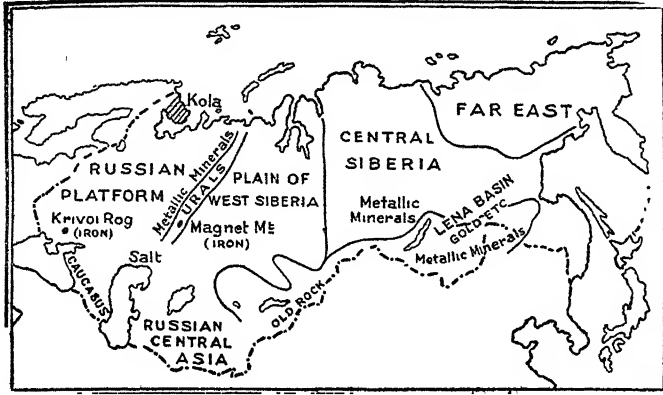
excellent coaking coal. Working also is cheaper than the Don basin. Other coalfields in active operation are in the Ural regions, in the Pechora basin (North European Russia), at Kausk, Irkutsk (in Central Siberia), in the Amur basin and on the island of Sakhalin in the Far East.

Soviet Russia is now the third largest producer of mineral oil in the world. Output of crude oil in 1950 was 37,600,000 tons. In production the Baku oil fields occupy first place and about half of the oil production of the country is from this region. Some of the oil is sent to Batum refineries from where petroleum is exported. Grozny and Maikop are the other important oil-producing districts in the Caucasus. Emba district between the Urals and the Volga is said to possess huge reserves of oil. New fields are also being prospected.

U. S. S. R. is said to possess about 53 per cent. of the world's iron ore reserves. In 1950 about 30 million metric tons of iron ore were raised in the country. Iron is mainly found in Krivoi Rog in the Ukraine region, and east of Moscow, Maghetogorsk in the Urals, Murmansk region and in the neighbourhood of Kursk. Russia is

possibly the second largest iron-producing country of the world.

Russia is also fortunate in possessing large varieties of non-ferrous metals. The country is the largest pro-



The Minerals of Russia other than Coal and Oil

ducer of manganese in the world, the output being nearly 3 million tons. Large supplies come from Nikopol district in Southern Ukraine and other deposits are mined in Georgia, Kazaksthan, the Central Urals and in Central Siberia. Nickel ores are obtained in the Central and Southern Urals, the Kola peninsula and in Kazaksthan. The country is the second largest nickel producer of the world. The U. S. S. R. produces 20 per cent. of the world's chrome ores, over a quarter of a million tons being raised annually. The major portion is raised in the Urals. The most important centres of copper mining are near Lake Balkash (Kazaksthan), near Urals, in Armenia and Azerbaizan. High grade aluminium ores are found in the east of Leningrad, in the Urals, and at Kamensk. About 200,000 tons of Bauxite are raised annually. Lead and Zinc are found in the Caucasus. Potash is found in Solikansk in the W. Urals and in W. Kazaksthan. Apatite (calcium phosphate) is found in the Kola peninsula. Tin is found near Verkhoyansk.

Non-ferrous metals

Precious
metals

Russia also possesses valuable metals like gold and platinum. The annual production of gold is estimated at about $4\frac{1}{2}$ million troy ounces. The Lena Basin is the most important producing area. Platinum is found in the Urals.

Climatic
Zones.Vegetation
Belts.

Climate and Vegetation.—Russia is an enormous land mass, and the climate must necessarily be of the continental type ; and indeed it is so, for the world's coldest spot lies in the heart of Siberia. But in summer temperatures of over 90°F. , are sometimes recorded even within the Arctic Circle. The whole country can be divided into at least six major climatic belts: there is first the region of Arctic Climate along the northern rim of Russia ; south of this lies the belt of Cold Temperate Climate, covering by far the largest part of the country ; the south-eastern margins have the Manchurian Climate, and to the south-west of the Manchurian belt is a small area of Steppeland Climate ; the Steppeland Climate occurs also along the borders of the Black Sea and the Caspian Sea, and south of this is found Desert Climate ; and lastly the East European type of climate occurs in the region nearest to the Baltic Sea. Corresponding to these climatic divisions are the major vegetation belts : along the Arctic seaboard lies the *Tundra region*, with its characteristic swampy soils and mosses and lichens. South of it lies the great belt of *Coniferous Forests* which yield valuable soft-woods ; the soil of the Coniferous Forest region is known as podsol,—it is ash-coloured and poor in plant food. Then there are *Deciduous Forests* in the region of East European Climate ; the soil is better. South of the Deciduous Forest region lies an enormous area of rich *grassland* with scattered trees ; this is the region of the famous chernozems or black earths of rich loess formation, and the region is naturally the great granary of Russia. South of the Black Earth region lie the *Steppelands* with characteristic chestnut-brown soil, which is fairly rich in plant food. Last of all, there lies the *Desert belt* around the Caspian Sea, with its red and yellow soils ; but the region, though infertile, is very important to Russia as it is the only area where tropical and sub-tropical plants can be grown after irrigating the land thoroughly.

Of the various animals of Russia, the most important commercially are those of the fur-bearing species such as the silver-fox ; and the country now produces nearly a third of all the furs entering into international trade. There are numerous reindeer in the north, and attempts have been made to utilise them for meat and milk. The fisheries along the northern and eastern coasts are of importance.

Agriculture.—Before 1917, Russia was primarily an agricultural country. But agriculture was then in a very backward condition. After the revolution, two main changes have taken place. First, the abolition of private ownership of land, and second, the introduction of scientific methods. Under the first and second five year plans most of the small holdings were united to form Collective Farms (Kolkhozes). Large State Farms (Sovkhozes) were also established. Virgin areas, specially in Siberia and Central Asia, have been brought under cultivation, and complete mechanization has been rendered possible due to collectivisation and the level nature of land in most places. The country is the world's leading producer of *wheat, barley, rye, flax and hemp*. It is also the second largest producer of *oats and sugar-beet*. *Rice, cotton and fruits* are the most important products of Soviet Central Asia. The chief wheat-growing area is in the Ukraine, but wheat is now cultivated farther north than formerly. The rye belt is situated north of the wheat belt. In the north climate restricts agriculture to quickly maturing crops, such as rye, oats, barley, potatoes, flax, hemp and sugar-beet. Cotton is mainly grown in the fertile and well-watered Ferghana Valley lying between Tashkent and Samarkand in Uzbekistan. This region produces more than 50 per cent. of the Union's raw cotton and large-scale irrigation schemes are constantly enlarging the area under cotton. Cotton-growing is also a major industry in Turkmenistan and Tadzikstan. The best sea-island cotton is grown here. Cotton is also grown in Kazakstan. Silk is another commodity produced. The minor products in Siberia and Soviet Central Asia are wheat, rice, sugar-beet, rye and tobacco.

Moscow
Region.

Industry.—The most important industrial region of Russia is around **Moscow**, the capital. This region is especially devoted to cotton and textile industries and the manufacture of clothing ; but there are various metal works and plants for the manufacture of machinery and chemical products in this region. The important industrial towns of the region, other than the capital, are **Tula**, **Kalinin**, **Yaroslavl**, **Ivanov**, and **Gorky**. The abundance of coal and iron has naturally made it the principal industrial region of the U. S. S. R. But the other important industrial region—that of **Leningrad**—has no coal nor iron. But its situation is in some respects better as it lies along the north-western sea-board of the country. The region specialises in ship-building, particularly in the construction of timber ships and ice-breakers, and in the manufacture of miscellaneous machinery. It has also an important clothing industry. Water-power is obtained from two rivers flowing through the region.

Leningrad
Region

Donetz-
Ukraine
Region.

Around the Donetz coalfield and covering a large part of the Black Earth region of the Ukraine is another seat of industry. This region specialises in iron and steel manufactures and the production of agricultural implements. There are sugar mills, flour mills, and tanning factories also. The region is rich in coal and iron. The important centres are **Krivoi Rog** and **Rostov**, better noted for the production of iron and steel. Another important region is that of the Urals and the Kuznetzk coalfield ; it is also rich in various minerals including coal and iron. The principal iron and steel town of the region is **Magnetogorsk** ; other centres include **Orsk** and **Kuznetzk**. Besides the heavy industries, this region specialises also in wood-working and textile industries. Around Tiflis, again, there is the very important Trans-Caucasian industrial region noted for its oil industry. The principal centres are **Baku**, **Tiflis**, **Grozny**, and **Maikop**. The Kola Peninsula in the north specialises in wood-working and some metal manufactures, and Russian Central Asia is concentrating more and more upon cotton manufactures. **Tashkent**, **Samarkand**, and **Kokand** are old centres of Russian Turkestan. Russia

Ural-
Kuznetzk
Region.

Trans-
Caucasian
Region.

under the successive **Five Year Plans** has made quite Other astonishing progress in industrialisation; of the total centres. national wealth 70 per cent. is now derived from manufactures, and only 30 per cent. from agriculture.

Planned Economy in U. S. S. R.—The industrial and commercial life of Russia was completely disorganised in 1921, as a result of civil strife, blockade and the attempt to substitute communism for individualism. At that time, the New Economic Policy was introduced by the state, which permitted a wide measure of participation of private capital in industry, agriculture and commerce. This resulted in an improved state of affairs and by 1928 production had in many cases reached, and in some had exceeded, its 1913 level. The Soviet Government at that time felt the necessity of drastic re-organisation of both industry and agriculture. Thus the *First Five Year Plan* First Five Year Plan. was inaugurated in 1928. It aimed at developing industries connected with electrification, mining, metallurgy, and machine construction, for the ultimate benefit of all other branches of industry. New centres of heavy industries were opened in the East. Under the New Economic Policy, class differentiation had grown and the conflict between the peasants and the industrial workers was becoming acute. A new class of well-to-do peasant proprietors (*Kulaks*) had come into being. In order to check these evils, a radical change in agriculture was contemplated by the conversion of small agricultural units into either state or collective farms. It was also deemed essential to make the country less dependent upon foreign goods and to put it on a stronger material basis for its future progress. The *Second Five Year Plan* Second Five Year Plan. (1933-37) envisaged not only a further expansion of industries but also the establishment of a more geographical distribution of industries. Fresh centres were opened up in Soviet Central Asia. By 1937, the output of coal was four times, that of petroleum three times as much, and the capacity of electric power stations eight times as great as, in 1913. The *Third Five Year Plan* Third Five Year Plan. came into force in 1938, and its operation continued throughout the last Great War (1939-45). It aimed at (1) increased

Fourth
Five Year
Plan.

regional self-sufficiency, especially as regards food-stuffs, fertilizers, bricks, cement, etc., and (2) for a further shift of the industrial centre of gravity to the east. The German invasion further accelerated the eastward movement of industries (specially heavy). These new centres in the East saved the U. S. S. R., during the critical years 1943-44, by supplying armaments and other industrial products. The Union also completed its *Fourth Five Year Plan*. It was mainly a post-war reconstruction plan, aiming at increase of agricultural and industrial output. It is reported that some new big enterprises have already been started. More attention is being paid to the industrial development in Western and Central Siberia. Work has begun on the construction of the Necinnomyssk Canal in Stavrapool territory, north of the Caucasus, one of the biggest irrigation projects of the Five-Year plan. The canal will link the Kuban and Yegorlyk rivers and supply water to the thickly populated Yegorlyk district. Collective farms in this area will be able to irrigate some 25,000 acres of cultivated land. There will be two hydro-electric stations on the canal, one of which is already being built. Work on the huge reservoir, in the Zeravishan river valley in the Uzbek Republic, suspended during the war, was resumed. This will be among the largest reservoirs in the Soviet Union holding 600,000,000 cubic metres of water. From Novosibilsrk comes word that a cotton textile mill, the biggest enterprise of its kind in Siberia, is being erected consisting of a spinning mill with 125,000 spindles, a weaving mill with 2,000 looms, a trimming factory and thread mill with an annual capacity of 120,000,000 bobbins of fabrics annually. Riga, the capital of Latvia, reports an extensive new harbour-building programme to improve shipping facilities.

Among the largest single projects of the new Five-Year Plan, all out exploitation of the copper resources at Jezkazgan in the heart of the semi-desert zone of Kazakhstan is being pushed ahead with all possible speed. The scheme for Jezkazgan, the biggest copper-producing centre in the Soviet Union, will be a major feature in boosting the

country's copper output by nearly two-thirds as compared with pre-war output.

Down in Georgia, on the wild prickly grasses of the Rustav plain is rising a new industrial community around an iron and steel mill that will produce 430,000 tons of pig iron, 500,000 tons of steel and more than 380,000 tons of rolled metal a year. The plant will have two blast furnaces, six open hearth furnaces, a blowing mill and a rolling mill. A special railway line is being built to bring in coal from other parts of Georgia.

Among agricultural improvements listed are the revival of large-scale production of Siberian butter, a considerable drainage scheme in the Barabinsk steppe, extended breeding of fine-fleeced sheep and dairy-cattle, and more meat and dairy farming and market gardening around the large towns.

Communications.—The enormous extent of Russia naturally brings the question of communications to the forefront. No other country in the world can perhaps be so much worried over the problem of conquering distance, and even with all the facilities for modern means of travel it is ten days' continuous journey from Moscow to Vladivostok by train. Moscow is the focus of railways. It is the centre of lines radiating to Samara (Trans-Sib. Ry.), Leningrad, Warsaw, Kiev and Odessa, the Crimea and Trans-Caucasia and Archangelsk. There are more than 66,000 miles of railway in Russia, and its regular air services now cover a route of some 30,000 miles. The rivers of Russia, however, are often shallow and they usually follow long, winding routes. Many of them have now been canalized and interconnected by means of deep canals, and at the present time Russia has nearly 70,000 miles of navigable waterway. They handle only about 10 per cent. of the goods traffic consisting mainly of heavy and bulky goods, such as timber and grain, ores and oil. Among the more important of these rivers are the *Volga*, the *Dnieper*, the *Don*, the *Neva* and the *Dwina*. The courses of many of these rivers have been regularised, their channels deepened and their tribu-

The Problem.

Railways,
Airways,
and Water-ways and roads.

taries interconnected by means of canals. The Volga is of the greatest importance, since, with its tributaries, it drains about 1/3 of European Russia—the most densely populated part, in which live some 50 million people. The basin of the Volga is connected with that of the Neva. The whole river system of the Volga was invaluable to the development of Russia in the early days of its history. The Ob, Yenisei and Lena are the important rivers in Siberia. Most of the rivers of the U. S. S. R., remain closed by ice for a period, which varies according to the position of their basins, from three to six months each year.

The U. S. S. R. possesses 220,000 miles of roads. Many new motor roads have been built within the last twenty years and these are particularly valuable in areas remote from railways. The new trunk roads are—Mocow-Minsk, Amur-Yakutsk, Orh-Khorag (across the Pamir), Taskent-Stalinabad, and from Bijsk to Altai. Vast areas of the North, however, still possess neither roads nor railways and depend entirely on waterways and air service.

Organi-
sation

Foreign Trade.—The foreign trade of the U. S. S. R. is organised as a state monopoly. Importation and exportation of goods are effected by special licences issued by the commissariat of foreign trade in pursuance of a plan annually sanctioned by the Govt. The Trade delegations in the foreign countries have only the power to purchase and sell commodities. The principal considerations which influence the planning and the development of the trade relations of the U. S. S. R. with other countries are (a) opportunities of marketing soviet exports (b) satisfactory conditions granted to soviet import orders (c) general political relations of the particular country with the U. S. S. R. Hence, the volume of international trade is very low. Even at the peak years the export trade was 2·3 per cent. of the world export trade and the import trade 2·6 per cent. of the world import trade. The chief exports are petroleum, flax, timber, grain, furs, manganese-ore, hides and leather, iron and steel and machinery etc. The main imports are machine tools, non-ferrous metals, electrical goods, tea, jute, rubber etc. The

Exports
and
Imports

exact value and direction of foreign trade in recent years is not known.

QUESTIONS

1. Describe the principal coal-fields in Great Britain and show their connection with the industries of the country.

2. Analyse the factors governing the climate of the Br. Isles pointing out the advantages as compared with the other regions of Europe within the same latitude.

3. Discuss the position of U. S. S. R. as a self-supporting economic unit. What are the commodities that this Union may need after the War, and which of these will India be in a position to supply?

4. Describe carefully and explain the importance of the inland waterways of France.

5. Describe the distribution of linen industry of Northern Europe excluding Great Britain and Ireland. Where do the raw materials come from? To what extent is this industry dependent on the supply of raw materials from India?

6. On an outline map of Europe mark the places containing important deposits of iron ore. Indicate also the regions from which coal is obtained near the iron ores.

7. What are the principal seats of ship-building in the United Kingdom and what are the geographical advantages for the industry enjoyed by them? What geographical circumstances tended to deprive the Thames of its rank it once held in this industry?

8. Compare Scotland and England as regards (a) physical features, (b) production and (c) distribution of population.

9. In what parts of Great Britain are all branches of the woollen industry most largely produced? Point out the local conditions favourable to it there and name three of the chief towns engaged in those districts.

10. Account for the localisation of the cotton textile industry in Lancashire. Also describe the present condition of the British cotton industry.

11. Consider the position of France with regard to her supplies of (a) fuel and (b) water-power.

12. State briefly the prospects of France with her colonial Empire becoming a self-supporting economic unit.

13. Name the three principal manufacturing industries of Great Britain and give reasons for their location.

14. What are Great Britain's sources of supply of food-stuffs and textile raw materials in normal times, how have these

been affected by the war? How is Great Britain trying to counteract the shortage of these commodities.

15. Describe the position of the principal coal-fields of Germany particularly as regards access to navigable waterways. Also name the chief manufacturing industries of these coal-fields.

16. Give an idea of coal and iron regions of Europe, and the industries which have been established there.

17. Describe the position of Continental Europe, excepting U S S R, and the Iberian peninsula, as a self-supporting economic unit. This region was known to be a very large consumer of tropical and sub-tropical foodstuffs and raw materials. How is the demand for these commodities being met now?

18. Why is it that (a) Britain occupies the leading place in the industrial world; (b) France is not a great competitor in world trade

19. Make a comparative study of the iron and steel industry of England and the U S S R. In your discussion, include all the factors affecting the industry.

20. Describe the general character of the manufacturing industries of Switzerland, giving illustrations, and indicate the circumstances, adverse and favourable, to their development.

21. Suggest a division of France into natural regions. Give full reasons for your answer.

22. Write a brief note on the development of inland water communications in Germany.

CHAPTER V

ASIA

The Continent of Extremes and Contrasts

Position and Size.—Asia, with a total area of more than 17 million sq. miles, is the largest of all the continents, and occupies nearly one-third of the land surface of the globe. It is continuous with Europe, with which it constitutes the great land-mass of Eurasia, covering an area of about 21 million sq. miles. The narrow isthmus of Suez connects it with the continent of Africa, and a festoon of islands link it up with Australia and the land-masses of the Southern Hemisphere generally. The continent itself,

Area.

Asia and
other
continents.

however, is situated entirely in the Northern Hemisphere. For its size, however, Asia has a rather short coast-line—only 34,000 miles, i.e., one mile coast to every 500 sq. miles of surface. From north to south the mainland stretches between $78\frac{1}{2}^{\circ}\text{N.}$ within the Arctic Circle and the Equator (0°); no town of any importance exists at the northern limits, and the only town of importance near the Equator is Singapore ($1^{\circ}1'\text{N.}$). Although the continent includes 155° or more of longitude between its extreme eastern and extreme western points and thus covers nearly one-half of the earth's circumference, the mainland extends from 25°E. on the west to 170°E. on the east, covering well over a third of the circumference of the globe. Yet the main territory does not, for the greater part, conform to the land-mass lying within these lines, and so the position of Asia may better be determined by reference to the longitudes of 45°E. , which runs by Baghdad and Aden, and 135°E. , by Kobe, Japan. The longitude of 90°E. , running by Barisal, Dacca, Dhubri, Lhasa, Krasnoyarsk, etc., may, therefore, be regarded as the central meridian of the mainland. The latitude of 40°N. , passing by Peiping, Kashgar, Bokhara, Samarkand, Baku, Ankara, etc., cuts the mainland into two equal halves—northern and southern. The position of the Tropic of Cancer ($23\frac{1}{2}^{\circ}\text{N.}$) is also important; this line, which passes by Maskat, Ahmedabad, Jubbulpur, Calcutta and Canton, penetrates through the heart of India from east to west.

Coast-line

Location.

Physical Features.—Topographically Asia consists of a number of broad physical units, which may be enumerated and described as follows :

1. **The Plateaus of Central Asia**, forming a huge triangular territory flanked by a succession of Alpine mountain chains. From the **Pamir Knot**, which is itself a plateau, known as '*the roof of the world*', issue huge mountain chains. To the south-east is the lofty **Himalayan Chain**, reinforced on the north by the **Karakoram** stretching eastward; farther north is the **Kunlun** which ultimately branches out in two directions

A complex of plateaus and Alpine fold mountains.

Pamir Knot the central focus of mountain chains.

Alpine.
range and
their conti-
nuation.

—the main line proceeding directly to the east while the other branch known as the **Altyn Tagh** proceeds eastward by a more northerly route ; to the north-east of the Pamir Knot is the **Tien Shan**. The Himalayan Chain penetrates along the north of India into China on the one hand and continues, on the other, along the border of India and Burma through the Andaman and Nicobar Islands as well as through Sumatra and Java to form the



The Physical Features of Asia

mountain festoons of the East Indies. The main chain of the Kunlun ultimately passes into the Tsingling Mountains of China, and the Altyn Tagh passes into the Nanshan or Southern Mountains of China. The Khingan Mountains, forming the natural eastern boundary of Mongolia, may also be a further continuation of the Altyn Tagh. The Tien Shan proceeds into the Pei Shan or Northern Mountains of China towards the east and extends

westward into Russian Turkestan as well. The plateau of **Tibet** lies between the Himalayas-Karakoram and the Kunlun. Between the Kunlun and the Altyn Tagh lies the **Tsaidam Basin**. Farther north is the **Tarim Basin** Plateaus, between the Kunlun-Altyn Tagh and the Tien Shan. The **Dzungarian Basin** is located between the Tien Shan and the Altai. The **Gobi Plateaus** and the **Ordos Basin**, bordered by the **Khingan** and the **Sayan Mountains** are to the north-east of the Tsaidam, Tarim and Dzungarian Basins. The Khingan passes into the **Stanovoi Mountains** farther north. Along the north-west border are also the **Barguizin**, **North Muya**, and the **Konam Mountains**. The **Vitim** and **Aldan Plateaus** lie farther north-east. These high plateaus of Central Asia cover well over a fifth of the entire continent.

2. **The Plateaus of Western Asia.** From the Pamir Knot, again, are given off another series of mountain chains bordering a second series of plateaus. To the north-west of the Knot are the **Trans-Alai**, **Alai** and **Hissar Mountains**; to the south-west lies the **Hindukush**, and to the south-south-west are the **Gilgit** and **Sulaiman Mountains**. The Trans-Alai, Alai and Hissar Mountains eventually fade into the plains of Russian Turkestan. The Hindukush proceeds along the north of Iran (Persia) for some distance and then branches out in two directions, —the northerly branch, after passing through the Caspian Sea, becomes the **Caucasus**, and the southerly branch, which sweeps along the southern shores of the Caspian Sea, passes into the **Elburz Mountains**. The Elburz continues along the **Armenian Knot**, farther west, to become the **Pontic Ranges** along the southern shores of the Black Sea. The Sulaiman Mountains continue as the **Kirthar Hills** and the ranges which define the southern boundary of the Seistan-Iran plateaus; then sweeping in a curve they proceed to the Armenian Knot as the **Zagros System**; from the Armenian Knot they continue farther west as the **Taurus** chain along the south of Asia Minor. Between the Pamir Knot on the east and the Armenian Knot on the west, and bounded by the Hindukush and the

Pamir Knot
the focus
of mountain
chains.

Alpine
ranges and
their con-
tinuation.

Armenian
Knot.

Plateaus.

Sulaiman lies the great **Iranian Plateau**; an eastern fragment of this large territory, covering portions of Afghanistan and Baluchistan, is known as the plateau of **Seistan**. To the north-west of the Iranian Plateau and beyond the Armenian Knot lies the plateau of **Anatolia** bounded by the Pontic and Taurus Chains.

A complex of plains, depressions, low plateaus and Alpine ridges.

3. **The North-Western Lowlands**, forming another triangular territory to the north of the central mountainous triangle. The whole of this area, however, is not a true plain; it is bordered along the central plateaus by 'high plains' buttressed by fold mountain ridges; the basins bordering the Aralo-Caspian depression on the south-west of this lowland triangle in Russian Turkestan, are separated by a number of hill ridges; Central Siberia, again, is a low dissected plateau, and Eastern Siberia, a complex of hills and plains not yet well explored. Western Siberia alone is a true lowland, bordered by the low ranges of the Urals on the west. The principal rivers of this region are **Ob**, **Yenisei**, and **Lena**.

A complex of river plains and Alpine festoons.

4. **The Eastern Complex of Lowlands and Mountain Festoons**. The great lowlands falling within this territory are the river plains of the **Amur** in Central Manchuria, plains of the **Hwang Ho** and **Pei Ho** in North China, of the **Yangtze Kiang** in Central China, of the **Si Kiang** in South China, of the **Mekong** in Indo-China, and of the **Menam** in Siam. These basins are separated by innumerable spurs of ancient mountains such as, the mountain of Eastern Mongolia in Manchuria, the Mongolian Plateau, the Tsinling Mountains and the Southern Mountains in China; the plateau of Yunan and Indo-China as well as the Great Indo-Malayan Mountains Block in Indo-China, Thailand and the south generally. A number of fold mountain curves guard these basins on the east.

5. **The Southern Complex of Plateaus and River Basins**, comprising the ancient tablelands of Arabia, **Peninsular India**, and **Indo-China**, and the river plains of the **Tigris-Euphrates**, of the **Indus-Ganges-Brahma**

putra. and of the **Irrawaddy.** These river plains separate the southern plateaus from the central mountain complex. A complex of river basins and plateaus.

Geology and Minerals.—The geology of Asia is even more complicated, and authorities naturally are more at variance with regard to its basal structure than to its orography. Here it is possible only to set forth the points upon which there seems to be some measure of general agreement.

The Anatolian Plateau, we have seen, lies between the Alpine chains of the Pontic and Taurus Mountains ; much of the interior of the plateau is also covered with rocks of the late Tertiary period ; but the hills which penetrate this Alpine cover are of folded Palæozoic and Mesozoic rocks. Such a region, we may easily anticipate, will be fairly rich in mineral resources—both metallic and non-metallic ; and Turkey, which is coincident for the greater part with the plateau of Anatolia, is known to be richly endowed with mineral wealth ; thus there are important **coal** measures especially along the Pontic Mountains ; **lignite** occurs in several other areas. Some of the largest **copper-mines** in the world are said to occur to the south-east of the plateau as well as in the south by the Taurus Mountains and also in the neighbourhood of the port of Trebizond on the Black Sea. Other important minerals of Turkey are **gold, silver, lead, zinc, chrome, manganese, antimony, iron, mercury, borax, emery, arsenic, meerschauum, and salt.** Turkey. The old massif of Arabia, Arab-Asia. which lies in the anti-clinical area of Alpine folding, is not known to have important mineral deposits, and so is also Palestine, except for its vast stores of **salts** (bromide, common salt, etc.). Iraq and Mesopotamia, however, have a covering of later rocks, and the whole of the Iranian Plateau lies in the main geosynclinal area of Alpine folding. We may, therefore, look for non-metallic minerals in these regions. Iraq has large deposits of **salt** and also some pool **coal**, and an abundance of **oil.** Iraq and Iran. Iran is known to have fairly large deposits of **coal** and **iron** in the north-west, but the most developed of her mineral resources is **oil** along the south-western belt, which, however, is linked with the

eastern oil-belt of Iraq. The Caucasian geosyncline, penetrating the Caspian Sea, continues as the **Oxus Oil Belt** to the north-east of Iran. Of the mineral resources of Afghanistan we know very little except that there are **iron** ores in Kaffiristan, **copper** in the Hindukush, **lead** in Hazara, **rubies** in Badakhshan, and **salt** deposits of the Tertiary age in Badakhshan, Bactria (Afghan Turkestan) and Herat. India as a whole is not rich in minerals ; her chief minerals are **coal**, **manganese**, **iron ore**, **mica** and **gold**.¹ The Himalayan geosyncline may be rich in non-metallic minerals as the coal and oil-fields of the Punjab show, but this huge and difficult area requires to be more thoroughly explored. The Assam Oil Belt geologically belongs to the great Burman geosyncline, although Assam coal-fields belong—at least for the greater part—to the Himalayan geosyncline. The whole territory of Burma can be analysed into three major geomorphological units,—(a) the Arakan Yoma, (b) the Shan Plateau, and (c) the Central Basin. The Arakan Yoma consists of a series of Alpine fold ranges, but has a core of ancient crystalline rocks. In this region occur **chromite** and some other useful metals. The Shan Plateau is formed of granite or gneissose rocks, abounding in **rubies** and other gemstones, and limestone rocks of a very ancient age. Large **silver-lead** ores, **tin** and **tungsten** are also found in this region. The Central Basin of the Irrawaddy consists almost entirely of Tertiary rocks ; here, between the Arakan Yomas and the Shan Plateau lie the famous **oil-fields** of Burma. Considerable deposits of **brown coal** also occur in this region. The island of Ceylon has a central mass of mountains formed by crystalline rocks of the pre-Cambrian period. These rocks constitute a great store-house of valuable gemstones, such as **sapphires**, **rubies**, **moonstones**, **catseyes**, etc. The basal structure of Indo-China has already been referred to ; the same general structure seems to be continued through the whole of South-Eastern Asia to the East Indies generally. The Burman geosyncline, too, appears to be continued through the whole region.

¹ For details see the Chapter on India.

The **oilfields** of Sumatra, Java, and Borneo are, thus, located in the belt of Tertiary sediments, which flank the central core of older rocks as Alpine fold chains. The mountainous tracts of Siam are geologically of the same character as those of Eastern Burma—varying, as they do, from pre-Cambrian to early Mesozoic periods in age, and having occasional lake-basins of younger rocks, and the country is rather rich in minerals—alluvial **gold, iron, coal, tin, zinc, manganese, antimony**, etc. French Indo-China has fairly large deposits of various minerals such as **coal, zinc, phosphates, tin**, and **graphite** in the Tonking region ; and **gold, lead, tin**, and **precious stones** in Cambodia. The principal minerals of Malaya are **tin, coal, gold, phosphate**, and **China-clay**. Besides **oil**, the minerals of the East Indies chiefly are **tin, coal, gold, silver, iodine** and **diamonds** ; diamonds are obtained from Borneo. The vast sub-continent of China may be divided into four main geo- China. logical units: (a) *The north-eastern massif* (Archean massif), formed mainly of pre-Cambrian crystalline rocks, and flanked on the west by Palæozoic fold sediments, and interspersed here and there by Carboniferous **coal-measures**. Included in this area are Korea, Liaotung, and East Shantung. Underlying the alluvial plain of North China is a down-faulted block of this massif. (b) *The North-western Basins*, bordering the northern parts of the Great Plain (plain of N. China) on the west, are composed of a series of synclinal and anti-clinal ridges ; the synclinal basins have enormous deposits of **Palæozoic** and Mesozoic sediments, folded long before the Tertiary age, the anti-clinical basins are formed of pre-Cambrian rocks. **Coal-measures** of various ages are believed to underlie these basins. (c) *The South China Block*, covering an enormous territory south of the Great Plain, seems to be of the same age, on the whole, as the Indo-Malayan Mountains Block, and in general of the same composition. Huge **coal-measures** occur here, and also **red sandstones** which have given the famous Red Basin its beautiful name. (d) *The Mountains of the Far West*, bordering the Red Basin and the South China Block, are believed by many to be of Alpine or Tertiary age. As it appears from this brief analysis **coal**

is China's foremost mineral ; estimates vary, but a conservative estimate places the total coal resources of China at about 100,000,000,000 tons.¹ **Iron** is also abundant in China, though much less than coal. The principal deposits are in Shansi, Chihli, Shantung, and Manchuria. The annual output of iron ores is about 1,500,000 tons. **Copper** and **tin** are plentiful, especially in Yunnan. China produces over 60 per cent. of the world's **antimony**, most of which comes from Hunan. Some **gold**, **silver**, **lead**, **wolfram**, **molybdenum** and **bismuth** are also found. There is **oil** in Shansi, but China is not known to have large resources of oil. Eastern Tibet is known to have considerable mineral wealth ; but our knowledge of that country as well of its associated basins is most rudimentary. For its size the geology of Japan is very complicated owing, chiefly, to the intensity of Alpine folding and its extraordinary volcanicity, and the country is not, on the whole, rich in mineral wealth. There are small **coalfields** and **oil pools** in the sedimentary rocks of the Tertiary age, and **anthracite** is also found in the Mesozoic rocks. Associated with Archean and Palæozoic rocks and Tertiary volcanics are found **copper**, **gold**, **silver**, and **iron**. **Copper** is the most important metallic mineral, and Japan ranks fifth among the largest producers of copper. The general facts relating to the basal structure of Siberia have already been noted. The country is rich in minerals. Its **coal** resources are said to be a quarter of the total coal resources of Asia or a half of those of Europe. **Oil**, however, is far less plentiful, although there are abundant resources in Sakhalin and Kamschatka. **Gold** is very widely distributed along the principal river basins, and so is also **iron**. Other minerals, such as, **copper**, **zinc**, **lead**, and **silver** are especially important in the Altai region, Yenisei province, Transbaikalia, and the Maritime Territory. **Tin**, **manganese**, **platinum**, **iridium**, and **osmium** are also fairly plentiful, and

¹ Stamp, Asia, p. 455. These figures as also much of the general materials have been taken from that book. One estimate places China's coal resources at 994,987,000,000 tons against 747,508,000,000 tons for the whole of Europe.

there are also numerous non-metallic minerals all over the country.

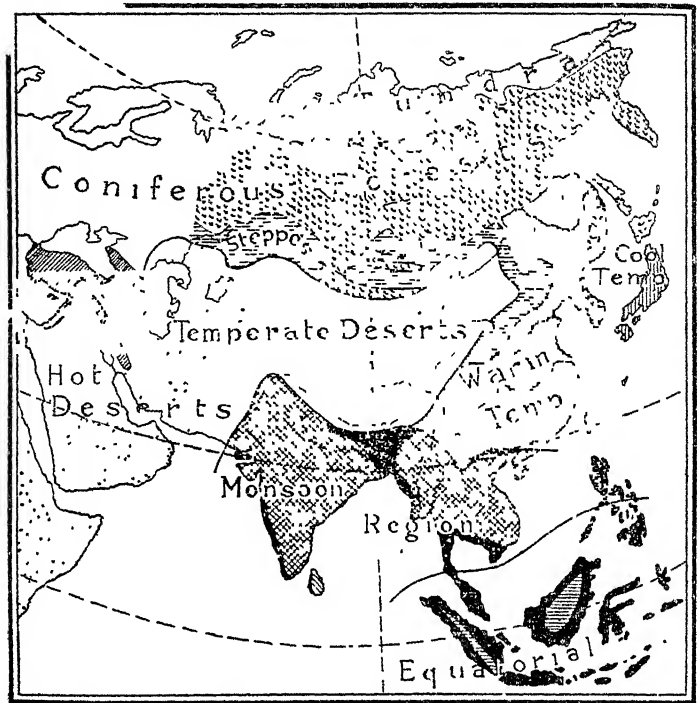
Climate.—The general nature of the climate of Asia is determined by two of its basic features ; the one is its *size* ; the other, its *central complex* of lofty plateaus and mountain chains. The interior of the continent is more than 1,500 miles from the sea,—a feature sufficient by itself to ensure extreme *continentality* of the climate.¹ This, however, is accentuated by the fact that the central tangle of plateaus and Alpine chains effectively cuts the interior off from all oceanic influences. The climates of Asia are, thus, characterized by extremes and contrasts to be found nowhere else on the earth in the same degree of completeness.

With the advent of the summer months, accompanied by a gradual shifting of the earth's thermal equator to the north of the Equator, the south and the centre of the continent become extremely hot, and a number of low-pressure centres are formed. Inflowing winds from the ocean then rush to these low-pressure centres, causing rainfall over the whole of Asia except the south-west (N. Arabia, Persia, Afghanistan and Baluchistan), which forms a continuation of the Mediterranean region of Europe and Africa. The amount of rainfall, however, is determined by topography : thus the great mountain barriers of the central plateaus prevent heavy showers all over the vast interior.

In the winter months, when the earth's thermal equator shifts to the south of the Equator, the centre and north of the continent become very cold, and a number of high-pressure centres are formed over the whole of the interior. Dry, cold winds then begin to blow out in all directions from the heart of Asia, but they are cut off in their progress towards India by the lofty Himalayas. Since these are dry winds blowing from a vast land surface, they do not bring in rain until they have crossed the seas. Thus the whole of Asia, excepting Japan, Central and South China, the coasts

¹ Meteorologically the whole of Eurasia together with the northern parts of Africa—a territory of about 25 million sq. miles—is considered as a single land mass.

of Indo-China, the Philippines and Ceylon and a few other places, is practically rainless in winter. The East Indies,



The Natural Regions of Asia.

however, have rainfall all the year round, owing to their situation in the Equatorial Belt. The Mediterranean continuations of Asia also receive some rain in the winter months.

Different climatic zones of Asia.

Owing to the vast extent of the continent and the diversity of its orographical features, a number of climate zones can be distinguished :

Malaya, East Indies and Ceylon

1. **The Equatorial Climate** prevails in Malaya, nearly the whole of the East Indies, and, in a modified degree, in Ceylon.

India, Indo-China, and S China

2. **The Tropical Monsoon Climate** occurs in India, Indo-China, and Southern China. The rainfall in Central

and Northern China and Japan is, no doubt, monsoonal, but the climate of these places is characterized by much colder winters ; moreover, these regions lie outside the Tropics

3. The Warm Temperate East Coast Climate Northern and Central China and Japan.
(China Type) is found in Central and Northern China and Japan. Unlike India, China is not protected by any mountain barrier like the Himalayas from the dessicating winter winds from the heart of Asia. Three sub-types are often distinguished :

- (a) *Central China sub-type*, represented by the climatic conditions of Shanghai and Hankow.
- (b) *Northern China sub-type*, represented by those of Peiping.
- (c) *Japan sub-type*, which is modified owing to the insular position of that country.

4. The Cool Temperate East Coast Climate Manchuria and Amuria.
(Manchurian Type) prevails in Manchuria and Amuria. This is akin to the Laurentian type ; but the rainfall is basically monsoonal.

5. The Hot Desert Climate (Sahara Type) prevails in Arabia and the desert regions of India. But the climate is not everywhere strictly of the Sahara type. At least two Arabia and Thar Desert. sub-types can be distinguished.

- (a) *The Thar sub-type*, which occurs in the Thar Desert of India and the Lower Indus Valley, is a very dry type of monsoon climate.
- (b) *The Mesopotamian sub-type*, occurring in Syria, Syria, Mesopotamia, and Persia. Mesopotamia, and Persia, is, likewise, a very dry type of Mediterranean climate.

6. The Temperate Desert Climate prevails in the high plateaus of Central and South-eastern Asia. It is particularly in these regions that we find evidences of extreme continentality. The rainfall, which is invariably very low, is peculiar in that the eastern parts receive their scanty share of moisture mainly in summer and the western parts mainly in winter. This apparent anomaly is easily explained

Tibet, Iran, Gobi, and Tukestan.

by the fact that these temperate deserts of Asia are bordered on the south-east by monsoon lands and by Mediterranean lands on the south-west. Four sub-types have been distinguished :

- (a) *The Tibet sub-type*, prevailing over most of Tibet and reaching as far to the south-west as Leh in Kashmir.
- (b) *The Iran sub-type*, prevailing in Persia and Afghanistan and characterized by rain in winter.
- (c) *The Gobi sub-type*, found in north-Tibet, the Gobi Desert and the Tarim Basin.
- (d) *The Turkestan sub-type*, occurring in the lowlands of south-western Siberia.

7. **The Mediterranean Climate**, found in the coasts of Asia Minor and Syria, and, in a modified degree, along the Kurdistan Mountains. The Asiatic Mediterranean lands, however, belong to the climatic zone known as that of the 'Eastern Mediterranean sub-type', and have, therefore, colder winters than the Mediterranean lands farther west.

8. **The Temperate Continental Climate** (Temperate Grassland Climate) is found in the steppelands of Western Siberia, and, in a modified degree, in the grasslands of Mongolia. It is characterized by long and severe winters, short and warm summers, and light spring and summer rains.

9. **The Cold Temperate Climate**, is found in the northern coniferous forest region of Asia. It is characterized by low average temperature and scanty precipitation mainly in the form of snow.

10. **The Arctic Desert Climate** (Tundra Climate) is found along the northern shores of Russia. It is characterized by very long and very cold winters, but very short and hot summers.

Natural Vegetation.—The natural vegetation of the Equatorial Regions of Asia is lofty, evergreen forest. The

forests are not so dense as in the Amazon or Congo Basin. The trees, especially the larger ones, are almost invariably of the **hardwood** species, and frequently rise to heights of 200 and 250 feet or more. Owing to the comparative openness of these forests smaller trees and ground vegetation are not wanting; bamboos, canes, grasses and other herbaceous vegetation are often found. But it is difficult to exploit these forests on a commercial scale, mainly because the taller trees commonly stand widely apart from one another. A fall in temperature due to elevation does not ordinarily affect equatorial vegetation below 5,000 feet. The natural vegetation of the monsoon regions is also forest; but the forests differ according to rainfall: where there is more than 80" of rain annually, evergreen forests of the equatorial type occur; the typical 'monsoon forests', however, are found in regions having an annual precipitation between 40" and 80"; these 'monsoon forests' are the home of the famous **sal** and **teak** woods, which, though of the hardwood species, are much more tractable than equatorial hardwoods. Since the Monsoon forests are more open than equatorial forests, bamboos and drier types of grass are more numerous. Where the precipitation is below 40" occur thorny trees like **acacia**. These woodlands gradually yield place to scrubland and thorny bushes as the rainfall decreases, and these latter to succulent plants of semi-desert regions. The frostline in the Monsoon regions is generally on a level of 3,000 feet, and hill forests of these regions fall into two broad classes—the evergreen forests represented by the various species of **oak**, and **coniferous forests**. The natural vegetation of East Asia seems to be of a mixed character—broad-leaved **evergreen trees** and **conifers** interspersed with bamboo, the **woodoil** and the **varnish** trees. The Chinese, it is interesting to learn, have almost wiped out the natural vegetation from their country. In Japan there are ever-green and deciduous broad-leaved trees of the hardwood species and conifers. In Manchuria and the adjoining tracts mixed forests of conifers and hardwoods predominate. The conifers include **spruce**, **silver fir**, **red pine** and **larch**, and the hardwoods are represented by **oaks**, **alder**, **ash**, and

(1) Equatorial Regions.

(2) Monsoon Regions.

(3) Temperate Monsoon Regions of China and Japan.

(4) Manchurian Region.

- (5) Medi-
terranean
Regions. **beech.** In the Mediterranean regions of South-Western Asia flourish evergreen woodlands of small trees represented by the **olive, myrtle, orange, vine,** and some **conifers** of smaller species. The grassland regions of Asia comprise those of south-west Siberia, the Mongolian plateau, and the low lands of Central Manchuria. **Coniferous forests** predominate in the cold temperate regions of Siberia and reach as far south as the mountains of Central Asia. The typical vegetation of the Arctic Regions consists of **mosses** and **lichens.** In the more favoured areas dwarf **shrubs** and **willows** exist. This Tundra vegetation is not only confined to the Arctic waters, but are found in the Tibetan uplands as well. The natural vegetation of the 'Desert Regions' is an impoverished proto-type of the more fortunate adjoining tracts.
- (6) Grass-
land
Regions.
- (7) Cold
Temperate
Regions.
- (8) Arctic
Regions
- (9) Desert
Regions

Population.—Asia is easily the most populous of the continents, but the population, besides being very irregularly distributed, is much smaller relatively to its area than that of Europe; for it has a density of about 46 to the square mile as against 90 in Europe. Yet, again, the combined population of the four Asiatic countries, *viz.*, India, Java, China and Japan, which together constitute an area equal to about five-sixths of the total area of Europe, is nearly double the population of the latter continent. The rest of Asia is extremely thinly peopled. The total population of India (excluding Pakistan), according to the census of 1951, is about 361,000,000 with a density of about 312 to the square mile; that of China some 400,000,000 with a density of 260; that of the Japanese Empire is expected to be nearly 100,000,000 with a density of 380, Pakistan with a population of 75 million (1951) has a density of 208 to the square mile, and Java with a population of 41,720,000 (1930) has a density of over 817. On the other hand, the vast tract of Arabia is believed to have a population density of 7; the enormous territories of Siberia, below 5; and much of Central Asia, under 1. The explanation of the anomaly is to be found mainly in differences of climate, and these differences are, in their turn, due to location and topography.

Certain
anomalies

Populous
countries

Under-
populated
areas.

THE COUNTRIES OF ASIA

TURKEY

The Exit from Asia

The Republic of Turkey comprises an area of about a third of a million square miles, and a population of some 15 millions. It includes a small European territory around Istanbul and Edirne (Adrianople) as far west as the Maritsa River. Turkey is practically coincident with that indefinite territory called Asia Minor. She, however, holds a key position at the entrance to the Black Sea. Position & Extent.

The whole territory can be divided into two broad regions,—(a) *The Plateau*, and (b) *The Coastlands*. Two broad climatic belts may easily be recognized; the coastal tracts have an essentially Mediterranean climate, but that of the plateau region is more akin to the climate of the steppelands of Russia—dry and severe. The people of the plateau region are nomads, and their principal occupation is stock-raising. *Wool* and *mohair* constitute the chief products of this dreary region, and Turkey held a virtual monopoly of the fine silky mohair until surpassed by South Africa. In the heart of the plateau region lies **Ankara**, now the capital of the Republic. The principal products of the coastlands are the typical Mediterranean fruits, such as the *grape*, *olive*, and *fig*; *wheat*, *barley*, *tobacco* and some *cotton* are also grown; *sponge fishing* is important amongst the Aegean Islands; another important product is *opium*, especially in the west coast. There are enormous forest tracts, yielding valuable timber and other forest products, such as *oak*, *pine*, *beech*, *fir*, *elm*, *lime*, *walnut*, *chestnut*, etc. **Izmir** (Smyrna) is the most important port and town on the west coast. Relief
Climate & Natural Regions.
Chief products.

Although richly endowed with mineral wealth, these, for the most part, lie unexploited yet, the working of metals being largely confined to the production of household utensils of brass and copper. *Carpet weaving*, however, is amongst the chief manufacturing industries and modern cotton- Production & Industry.

Communi-
cations.

ginning and cotton-oilcake factories as well as salt and sugar works are steadily being established. *Silk* production and the manufacture of silk fabrics are old industries. Some *mining* is also done, but the production is small at present, although future prospects are bright. The difficulty in exploiting the mineral resources of the country has been attributed mainly to the lack of communications. The total road mileage of Turkey is some 30,000, but the road system shows a curious absence of main trunk lines, which has resulted in the isolation from the rest of the country of even such important centres as Izmir and Bursa. And the railways constitute a total mileage of some 3,000 miles only. But railway connections have now been established between Ankara and Paris *via Istanbul* on the one hand (Simplon-Orient Express—Paris to Istanbul), and between Paris and Tripoli (Syria) *via Istanbul* and Aleppo. There are two railway systems in Turkey:—the one, conveniently grouped as the Anatolian-Baghdad system, runs, with all its adjuncts considered together, across the whole country from Haidar Pasa, opposite Istanbul, to Nisibin on the Syrian border, connecting Ekichehr, Konia, Adana and Aleppo (Syria), and throwing out lines to Ankara and Kaisarie; the other, grouped as the West Coast system, establishes communications amongst Panderma, Izmir, Aidin etc. Various projects are now under consideration: thus there are projects of establishing communications between Adalia and Konia, Sivas and Kaisarie, Erzerum and Trebizond, and so on.

Foreign
Trade.

It is, however, difficult to obtain accurate figures relating to the foreign trade of the Republic, owing mainly to governmental reticence on the subject. The general trend of the trade, however, may be indicated by the following tables compiled from the incomplete statistics available :

The Exports of Turkey

Tobacco	..	..	..	28	per cent
Fruits & Vegetables	..	..	..	17	" "
Cotton & Cotton manufactures	..	..	..	12	" "
Wool & Wool manufactures	..	..	..	9	" "
Various	..	..	..	34	" "

The Imports of Turkey

Manufactures			
Cotton goods	..	..	31 per cent
Woollens	..	..	7 " "
Metals	..	..	9 " "
Cereals	..	..	9 " "
Colonial goods	..	..	8 " "
Various	..	..	36 " "

Cyprus, an island to the south of Turkey, is a British Agriculture. Crown Colony. Its chief products are *beans*, *wheat*, *sesame* and *grapes*. The small amount of export consists mainly of wine and agricultural products. The capital Towns. is Nicosia, and the chief port is Larnaka.

ARAB ASIA

Introductory.—Arab Asia is both a geographical and cultural unit. It comprises roughly the whole of south-western Asia 'lying, south of the main mountain belt of Armenia and west of the Zagros'. The predominant language over this vast territory is Arabic, and the culture essentially Semitic and more pronouncedly Islamic. Prior to the Four Years' War (1914-18) nearly the whole of it was a part of the Ottoman Empire. As a result of the post-war settlements it is now divided into the French mandated territory of **Syria**, Republic of Israel and **Transjordan**, the kingdoms of **Iraq** and **Arabia**, and the British sphere of influence extending from Aden.

SYRIA lies south-west of Asia Minor, and readily falls into four natural divisions: (a) *The Western Coastal Plains*, formed by a succession of extremely narrow strips of land. The climate is, of course, Mediterranean, the rainfall fairly abundant, and the soil fertile. The chief products are **oranges**, especially in the Plains of Tripoli and Sidon (Saida), **olives**, particularly in the Plain of Beirut, and **tobacco**, mainly in the Plain of Latakia. The principal towns of this region are ports of Alexandretta, Latakia, Tripoli, Beirut, and Sidon (Saida), all actually open roadsteads except **Beirut** which has a good semi-

Geographi-
cal &
cultural
homogene-
ity.

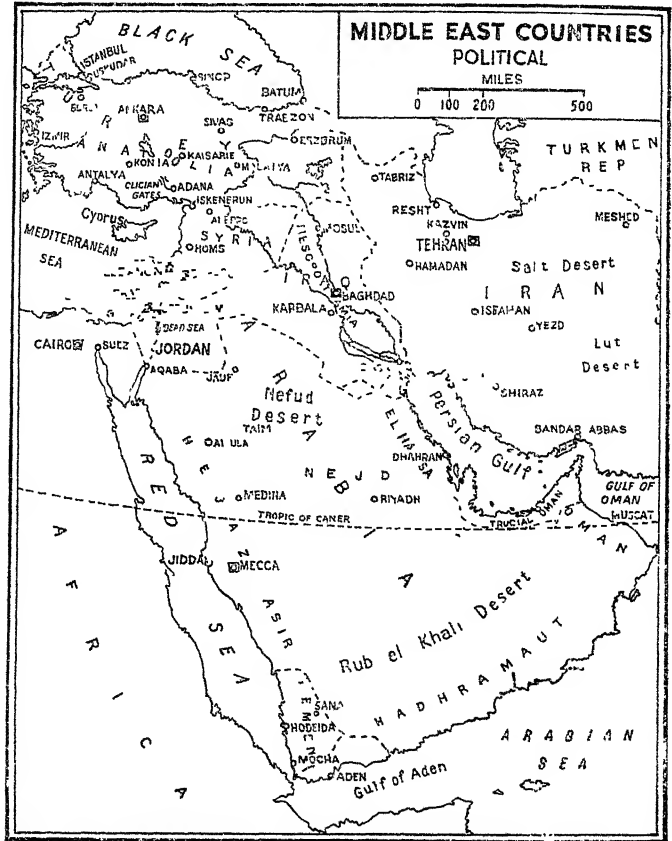
Political
units.

Position &
Natural
Divisions.

Products &
Trade
Centres.

Products &
Minerals.

natural harbour. (b) *The Western Mountain Ranges*, formed by the three principal blocks of the Amanus Range (Giaour Dagh) Jebel en Nuseiriye, and Lebanon. There are occasional forests, from which the famous **Cedars of Lebanon** are obtained. North Lebanon also yields quality iron-ore, and there is lignite in South Lebanon. Syria, however, is poor in mineral resources. To the east of Lebanon is the Anti-Lebanon, and in between the two is



the valley of the Litani river. (c) *The Great Central Depression*, actually an agglomeration of unhealthy marshes and fertile tracts of land, formed by the fertile plain of

Antakia (Antioch), and the Basin of the Orontes river. The principal products are temperate **cereals** (wheat, barley, durrah, etc.), and temperate **fruits**. On the banks of rivers and near the marshes **liquorice root** grows wild. Products & Trade Centres. Another important thing extensively cultivated is the **mulberry tree** for the silk worms; **silk** production is an important industry, especially in Antakia. The principal towns of the region are Antakia, Hama, and Homs. Cotton growing has increased in recent years. (d) *The Eastern Mountain Ranges*, which gradually fade into the Syrian Desert. The whole of this region, except a few places such as the lands around **Aleppo** and **Damascus**, is Products & Trade Centres. climatically very dry, and subject to dessicating cold winds in winter and severe heat in summer. Large numbers of sheep and goats are kept in Syria, especially in the Aleppo district, and **wool** forms an important item of export. Syria is rather well served by roads and railways. Communications. There is direct railway communication between Aleppo and Tripoli *via* Hama and Homs. The Simplon-Orient Express which runs from Paris to Istanbul is now continued, by means of connections, to Egypt through Syria and Palestine. There is broad-gauge connection between Aleppo and Tripoli and narrow-gauge (metre gauge?) trains run between Damascus and Beirut, as well as between Damascus and Haifa; the latter line runs to Egypt from Haifa (Palestine). Motor cars run from Tripoli to Acre Trade. (Palestine), *via* Beirut, Sidon, and Tyre, as between Damascus and Beirut, and between Aleppo and Acre *via* Hama, Homs and Damascus. Cotton, raw wool, raw silk and fruits are the chief exports; textiles, cereals and iron and steel goods form the chief imports. Most of the sea-borne trade is with France, Britain, and Italy.

ISRAEL was formed out of the former British mandated **PALESTINE**. It is a sovereign republic. Position. It falls into a number of natural regions running more or less parallel to the Mediterranean: (a) *The Coastlands* on the west are very much alike in climate, fertility and products to those of Syria. This is the region of the famous **Jaffa oranges**. Natural Regions. The principal towns of this region are Acre, an ancient

Communi-
cations.

town and port, **Haifa**, the chief port of Palestine, **Jaffa**, an open roadstead but owing to its position the central outlet of the country, the newly built Jewish town of **Tel Aviv** adjoining Jaffa, and Gaza, a minor port. (b) *The Hill Country* lying in the middle serves mainly as an extensive pasturage for sheep and goats. Some olive is grown in the comparatively fertile tracts. This is the region where lies **Nazareth**, the famous old village of Biblical antiquity, and the town of **Jerusalem**, the Mecca of the Christians. (c) *The Jordan Rift Valley* (El Ghor), consisting of the river Jordan, the Ganges of the Christians, the Sea of Galilee, and the Dead Sea. Naturally the region is cut off from the rain-bearing westerly winds and is, therefore, climatically as dry as a desert except for the waters of the Jordan. Salt is obtained from the Dead Sea, and electricity is generated from the flowing waters of the Jordan for illuminating the holy city. The country is well served by roads and railways. There is road communication between Nazareth in the north and Jerusalem (and beyond) in the south; from Nazareth one road goes as far as Tripoli (Syria) along the coast, and another to Aleppo *via* Damascus, Homs and Hama. There are road communications between Haifa and Nazareth (and beyond), and between Jaffa and Jericho in the Jordan Valley (and beyond) *via* Jerusalem. Various projects for a new system of trunk roads (as between Haifa and Gaza along the coast and between Haifa and Jericho over the interior) are being considered. The railway lines along the coast connect all the ports, while throwing out branch lines to all the important inland towns.

TRANSJORDANIA, east of Israel, actually constitutes the margin of the great Desert of Arabia. Its chief town, **Amman**, has motor communication with Jerusalem and Jaffa. The unfinished Hejaz Railway destined to Mecca also proceeds through this town. Agriculture and pastoral pursuits form the chief occupations of the people.

IRAQ, bordered on the west by Syria and Arabia and on the east by Persia, falls into four natural divisions: (a) *Kurdistan*, a mountainous tract on the north-east; (b) *Upper Iraq*, corresponding roughly with Assyria of old and embracing a considerable portion of Mesopotamia; (c) *Lower Iraq*, extending roughly from Baghdad to the Persian Gulf, and thus embracing the greater part of Mesopotamia; and (d) *The Desert Fringe* on the west. Mesopotamia, literally meaning the land between the rivers, is the country drained by the Tigris and Euphrates. The general barrenness of Kurdistan is only occasionally relieved by good pastures and cultivable lands on the lower slopes and in the valleys. That portion of Upper Iraq which lies between the Tigris and the foothills of Kurdistan is also not fertile except for the deep broad valleys of the Tigris and its tributaries, the Great Zab and Little Zab. Upper Mesopotamia, which is included in this division, is an open, undulating plain with a few range of low hills; it, too, is not a fertile tract of land. Lower Iraq, however, is a fine fertile alluvium. The **date** crop is the most important agricultural product of Iraq; for 80 per cent of the world's dates are produced here. It is the staple food of the Arabs. **Rice**, though of poor quality, ranks second amongst the agricultural products. The largest concentrations of dates and rice as well as of **maize**, **millet**s, and **sesame** are in Lower Iraq. Iraq specializes in the cultivation of **wheat** and **barley**, where 'dry-farming' is the general rule. Another important crop is **tobacco**, especially in the north. Iraq also produces **opium**, **hemp**, **lentils** and **liquorice root**, particularly in the famous Shatt-el-Arab region in the extreme south. The production of **cotton**, however, is meagre, but there are great possibilities for growing the finest types of Egyptian cotton. Large numbers of camels, horses, donkeys, sheep and goats are reared by the nomadic and semi-nomadic tribes on the desert fringes and the upland plains of Upper Iraq. Fine **wool** and **mohair** are obtained from the sheep and the Angora goats of Kurdistan. The mineral wealth of Iraq consists of **salt** and some poor quality **coal**, but, above all, of **oil**. There are three oil-

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belts—the western belt runs along the Euphrates Basin, the middle belt along the Tigris Basin, and the eastern belt along the border of Iran. The eastern belt was discovered only in 1927, and since the construction of a twin pipe-line to Tripoli and Haifa in 1935 production of oil has greatly increased. Iraq is, on the whole, well served by rivers, roads, and railways. The Tigris is navigable by steam craft for more than 450 miles from above Baghdad to where it unites with the Euphrates to form the Shatt-el-Arab. Below this point, however, navigation is impossible except for very small crafts because of the loss of water in a number of distributories. The Euphrates is too much obstructed by shallows. Though there are good motor roads in Iraq, the absence of trunk lines is obvious. There is railway communication between Basra in the south with Kirkuk in the north *via* Nasiriah, Hilla and Baghdad. Another railway line starts from Baghdad to Mosul through Samarra, but there is a project to discontinue this line and link Baghdad and Mosul by a new route starting from Kirkuk. The principal town of Iraq is **Baghdad** situated in the heart of the country. It has been a meeting place of caravan routes from Arabia, Syria and Persia for centuries on end, and is now a centre of various manufactures—silk, woollen, cotton, rugs, pottery, etc. **Basra**, on the Shatt-el-Arab, some 60 miles from the sea (Persian Gulf), is the chief port—indeed the only port accessible by ocean-going vessels. **Mosul**, the third city of Iraq, is the principal town of the north. Nineveh, the capital of the ancient Kingdom of Assyria, was situated near the modern town of Mosul. Near the ruins of Babylon is another town, Hilla, situated on the river Shatt-el-Hilla. To the north-west of Hilla is the holy city of **Karbala**, and to the south-west of Hilla is **Najaf**, another holy city. Kut-al-Imārah and Kurnah 'Amārah are important wheat centres on the Tigris.

The foreign trade, as is quite usual, shows an unfavourable balance ; for, of the total value of this trade nearly 50 per cent is covered by imports, less than 25

per cent by exports, while transit trade accounts for the remaining 25 or 30 per cent. This transit trade is actually *entrepôt* trade, carried on mainly with Iran, and in this Iraq is in keen competition with Russia.

ARABIA is a desert tableland, climatically very dry ; only the mountainous tracts of Yemen in the south-west and Oman in the south-east have a rainfall sufficient for the cultivation of the **coffee** plant. But the prolonged washing away of the soil has rendered coffee-culture difficult. The isolated oases in the interior, however, are suitable for the **date-palm**. Arabia is now divided into a number of political units such as the kingdoms of the Hejaz, Oman, Nejd, the Imāmate of Yemen, the Egyptian dependency of Sinai, the British protectorate of Koweit, the British possession of Aden, etc. The **Bahrein** Islands are also under British protection. Riyādh, in the heart of the oases region, is the capital of Nejd. Sanā, an upland town in the interior, is the chief centre of Yemen ; its port is **Hodeida**. But the port of **Mocha**, famous for the '**Mocha coffee**' is the principal outlet for Yemen. The holy cities of **Mecca** and **Medina** are in the Hejaz. **Maskat** (Muscat) is the capital and port of Oman. Korein (Grane) is an excellent natural harbour round the inlet of Koweit (Koait). Manama is the capital and commercial centre of the Bahrein Islands. **Aden**, on the south coast, a fortified coaling station and *entrepôt*, has an admirable natural harbour. Its area is 75 sq. miles, but the settlement includes the island of Perim in the Straits of Bab-el-Mandeb with a further area of 5 sq. miles, and a hinterland, forming a British Protectorate, comprising an area of 9,000 sq. miles. The trade of Arabia is small. The most important item of export is perhaps the **fine Mocha coffee**, but the quantity raised and exported is not much. But the quality and price of the indigenous coffee enable the Arabs to import the cheaper Brazilian or Javanese coffee for home consumption. Other items of export are **gum**, **hides**, and **wool**. The Bedouins carry on the breeding of **camels**, and sell them to the settled peoples of Arabia, Syria, Palestine and other places. **Asses** are also

Relief,
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bred in large numbers, in Hejaz, Nejd, and Yemen, and are sold ; for in Arabia they are scarcely less important than camels as means of transport. The famous **Arab horses** are also bred, especially in Nejd, but they are of much less importance than either camels or asses. Bahrein is the centre of the **pearl fisheries** of the Persian Gulf.

IRAN AND AFGHANISTAN

Position.	<p>PERSIA, now officially known as IRAN, lies east of Asia Minor. It is largely made up of tablelands encircled by Alpine fold ridges. The elevation is greater in the east.</p>
Relief, Climate & Rainfall.	<p>Precipitation is rather heavy in the mountainous north and west ; but since it occurs mainly in winter, most of it is in form of snow. This, however, has a salutary effect on the productivity of the land as the melting snow in spring feeds a large number of streams that can be used for irrigation. Otherwise nearly the whole of Iran would be a desert like Arabia. At present roughly the eastern half of the country may be classed as desert or semi-desert. The climate of Iran, especially of the interior, is sufficiently distinctive to be described as of the Iran type ; it is there blazing hot and dry in summer and moist and intensely cold in winter. The high summer temperature enables the</p>
Production & Industry	<p>cultivation of the date-palm at an altitude of 3,500 feet, of rice at 4,000 feet, or cotton at 5,000, of the grape-vine at 7,500, and of wheat at 9,000. Rice, however, is grown mostly in the swampy plains bordering the Caspian Sea, and although the bulk of it is consumed at home, a small quantity is exported mainly to Russia. Wheatlands are much more uniformly distributed all over the country, and a large surplus is available for export. Another crop deserving special mention is opium, cultivated largely for export. Persian tobacco is of excellent quality, but home consumption being high, only a small surplus is exported. Persia's cotton is coarse and short-stapled ; before the Four Years War, however, Russia was the leading customer of this commodity ; now cotton production has declined, and Persia imports large quantities of cotton goods and yarn—the latter largely from India—for her own carpet industry.</p>

But the country is said to have a soil in Khuzistan, a portion of the Tigris lowland, suitable for American and even for Egyptian cotton. Some **barley**, **millets**, and **maize** are also grown throughout the land, but no surplus is available for export. Sugar-cane can be cultivated in the region of rice, and the soil and climate of Persia are fairly suitable for beet as well ; but the bulk of her sugar requirements has to be imported at present. The climate of Persia is suitable for a variety of **fruits**—both Mediterranean and tropical. The manufacture of **wines** from the vine is of some importance. **Sericulture**, for which Persia has always been famous, came to the verge of ruin owing to a disease in the latter part of the last century ; yet it is still important in the region bordering the Caspian. The bulk of the raw **silk** now produced goes to France, Italy, Russia and Turkey. There are large numbers of transport animals in Persia—horses, mules, donkeys and camels, as well as sheep and goats. Much **wool** is produced both for export and the local manufacture of carpets and shawls. Persia is believed to be fairly rich in various minerals ; but their existence is as yet mostly problematical, and even those that are positively known to exist have not been, with the only exception of **oil**, thoroughly exploited owing, mainly, to transport difficulties. The oil industry has been in the hands of the *Anglo-Iranian* (formerly Anglo-Persian) *Oil Co. Ltd.*, since 1909. The British Government owns a disproportionately large number of shares in the Company. And the purchase of shares was prompted by the necessity of getting oil mainly for the British Navy. A pipe-line, 145 miles long, connect the source of the oil at Maidan-i-Sulaiman with the refinery on the island of Abadan in the Persian Gulf. More than 15 per cent of the total revenue of the Government of Iran is derived from the royalties from the Company. This oil-belt, we have seen, lies along the south-western border of Persia, and is linked with the eastern oil-belt of Iraq. There are abundant oil resources in Northern Persia as well. In the north-west there are **coal** and **iron**, and it was proposed, sometime ago, to manufacture steel rails in that country. Persia is handicapped in her national economy by two major drawbacks : the country

Minerals.

Exploits of
Anglo-Iranian
Oil Co.Persia's
problems.

**Communi-
cations.**

lacks man-power and modern means of communication. The whole territory is larger than the British Isles, France, Belgium, Holland, Switzerland and Germany combined, and yet the population is about 10 millions, of which some 3 millions are nomads. There are only about 230 miles of railways, some 600 miles of motor roads, 1,500 miles of gravel-surfaced roads, and 3,000 miles of unmetalled roads. Three railway systems, however, enter Persia from foreign lands : one line terminating at Duzdap in the south-eastern frontier connects it with Pakistan *via* Quetta ; another line terminating at Tabriz in the north-west establishes communication with Russia *via* Julfa on the Russian frontier ; another line from Basra and Damascus terminates at Khanigin on the Iranian frontier. From Tabriz and Khanigin to Tehran, the capital, there are motorable roads ; but Duzdap to Tehran is an arduous journey of hundreds of miles by motor roads and caravan routes. A north-south railway, destined to connect Bandar Gaz on the Caspian Sea, Tehran, Hamadan and Mohammera near the Persian Gulf, has been under construction for some years. Oil represents 60 to 65 p.c., of the countries exports. The chief imports are sugar, tea, Iran and steel manufactures and textiles.

Chief Towns of Iran

Tehran	..	360,000	Bandar Gaz	..	Caspian Port.
Tabriz	..	219,000	Astara	..	"
Meshed	..	139,000	Bandar Shapur	..	Persian Gulf Port.
Siraz	..	119,000	Bushire	..	"
Isfahan	..	100,000	Bandar Abbas	..	"
Hamadan	..	—			

Position. AFGHANISTAN may be said to occupy the eastern third of the great Iranian Plateau. Except for a small strip on the north (Plain of Turkestan), the country is an

Relief. agglomeration of lofty mountains and elevated plateaus. The climate is much like that of Iran—dry and sunny and subject to extremes of temperature. Much of the insuffi-

Climate. cient precipitation is in the form of snow, and this gives rise to a large number of short-lived streams in spring. Cultivation is confined to oases and the large river valleys of the Kabul and the Heri Rud. The leading crops are

dates, pomegranates, and sugar cane; some wheat, barley, millet, maize, rice and a number of fruits (oranges, figs, grenadines) are also grown. There are large numbers of sheep, especially the fat-tailed sheep, said to be a native of Afghanistan. **Meat, grease, wool and skins** are obtained from them. **Kabul**, the capital, stands on the Kabul river. It is connected with Peshwar by a motor road through the famous Khyber Pass. Another motor road connects it with Bamian. **Kandahar**, another important city, has motor communication with the capital. **Ghazni**, once the centre of a large empire, lies on the motor road between Kabul and Kandahar. **Herat**, on the Heri Rud, is connected by a circuitous motor road with Kandahar. A railway from Merv, Russian Turkestan, terminates at the Afghan frontier north of Herat. Another line from Quetta proceeds to Chaman on the Afghan frontier some miles south-east of Kandahar. There are motor roads from Herat to the frontier between Afghanistan and Russian Turkestan, from Kandahar to Chaman, and from Kabul to Lundikhana where the railway from Peshawar terminates. Except the motor roads mentioned above goods are carried by beasts of burden like camels, asses, pack-horses and oxen. Afghanistan was once the great gateway of trade between India and Central Asia; a large part of the merchandise then passed through the Bamian Pass between the Hindukush and the Koh-i-baba west of Kabul. At present the small foreign trade of Afghanistan is mainly with India *via* Peshwar (in Pakistan) and with Russian Turkestan *via* Mazar-i-Sharif in Afghan Turkestan. Statistics are not available for the total trade; but the principal exports from India consist of cotton goods, tea, sugar, dyes, hardware and various small manufactures; exports to India consist mainly of wool, sheep-skins, wood and fruits. Imports from India alone are usually in excess of exports in value.

Chief towns
& communi-
cations.

Foreign
trade.

INDO-CHINA

Introductory.—The peninsula of Indo-China, lying as it does between India and China, is a separate geographical unit.

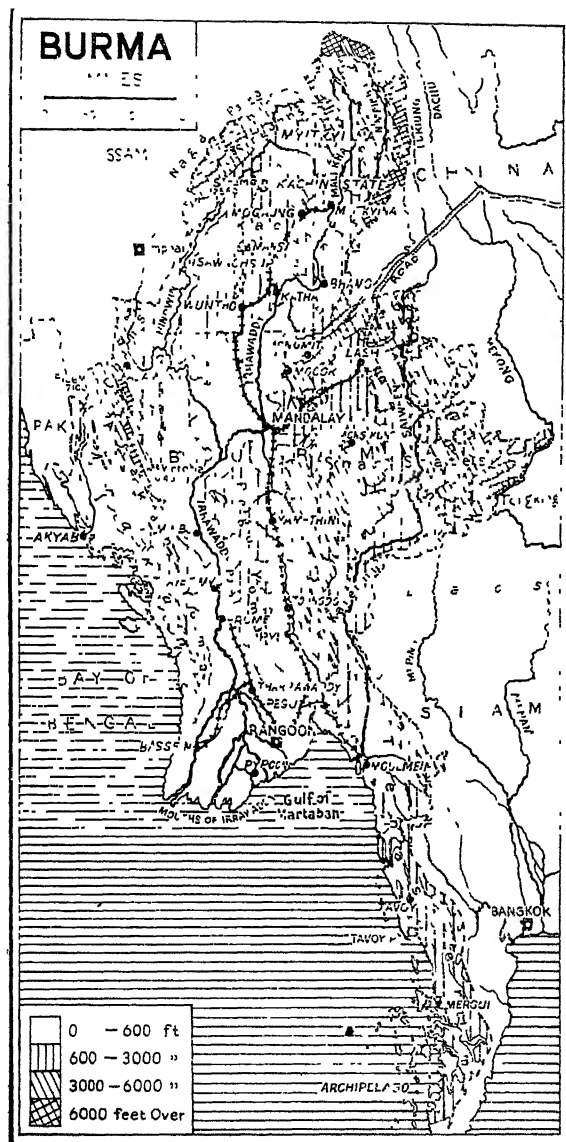
Geogra-
phical
units.

unit by itself. To its south, however, is the long narrow subsidiary peninsula of Malaya. But despite this geographical unity, both are now divided into a number of states, namely, Burma, Thailand, Federation of Malya States, Lower Cochin-China, Cambodia, Anam and Tong King.

THE UNION OF BURMA, till lately a province of India, became an independent sovereign state in 1948. The Union has an area of about 261,610 sq. miles and a population of 18·6 millions (1951). The coast line is 1,200 miles long and it is more broken than that of India. Geographically a part of Indo-China, Burma is cut off from India by the lofty chains of the Arakan Yoma on the west. The most characteristic feature of its surface relief is the north-south alignment of its mountain chains and major river basins. Covering the whole of the east is the great massif of the Shan Plateau. In between the two is the great Central Basin drained by the Irrawaddy and Chindwin.

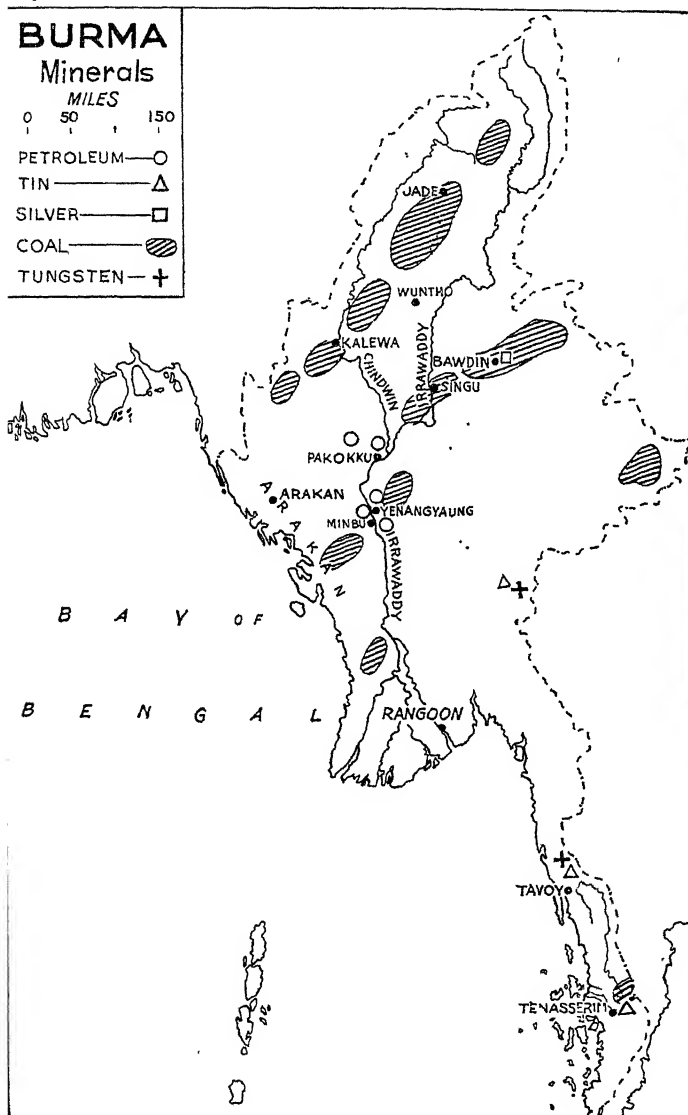
The greater part of the country lies within the tropics. The climate of Burma has much similarity to the climate of India and it is monsoonal in character. There is a marked dry belt in the heart of the country. The rainfall here is as low as 20 inches. Southern Burma has a hot and humid climate. Northern Burma is much drier and cooler owing to its altitude. Rainfall occurs from May and ceases in October due to the monsoons. The rainfall is governed by topography ; it is heaviest in the mountainous west and the Irrawaddy Delta—as high sometimes as 200" annually ; but the interior, sheltered by the surrounding mountains, is a dry country suffering from semi-desert conditions. There are dense equatorial or semi-equatorial forests in the hottest and wettest regions ; then there are monsoon forests, yielding valuable teak wood, where rainfall is between 48 and 80 inches a year ; the drier parts are covered by scrub. Besides these, there are extensive tidal forests in the Irrawaddy Delta, where tall trees of considerable value abound.

Agriculture. ,Burma is, of course, essentially an agricultural country ; but at present only about 20 per cent., of the land is under



Products. cultivation. **Rice** is by far the most important agricultural product, covering, as it does, no less than 66 per cent., of the land under tillage. Its cultivation is confined mainly to the Irrawaddy Delta, the valley and delta of the Sittang and the coastal strips of Arakan and Tenasserim. Other important agricultural products are **sesamum** (covering 6 per cent of the land under tillage), **beans** (6 per cent), **Maize** (6.1 per cent) **millet** (6 per cent), **groundnuts** (8 per cent), and **cotton** (2 per cent). Fruits and vegetables, tobacco and rubber—the last especially in Mergui and Tavoy—are also grown. About 10,000 tons of natural rubber is produced annually in Southern Burma. Irrigation is essential in the dry interior; the principal channels of irrigation at present are the **Mandalay Canal** (40 miles), with fourteen distributories, the **Shwebo Canal** (27 miles) with its two branches (20 and 29 miles), and the **Mon Canal** (53 miles).

Minerals. Burma, we have seen, is rich in minerals. There are extensive fields of **lignite**, little exploited as yet, in the Chindwin Valley and the old lake basins of the Shan Plateau. **Iron** is said to have been fairly well distributed over the hill tracts; but the production has considerably diminished now owing, chiefly, to its extensive exploitation in the past by local inhabitants. **Gold** is found in nearly all the rivers in Upper Burma; but the output is small. There are important **silver-lead** deposits at Bawdwin and other parts of the Shan Plateau. The mine at Bawdwin, said to be one of the largest silver-lead mines in the world, is worked by the Burma Corporation, Ltd., mainly a British concern. From their smelting works at Namtu the refined minerals are sent by rail to Rangoon for export. The Corporation also works some **zinc** and **copper**. Some of the other silver-lead mines of the Shan Plateau were formerly worked by Chinese miners. The Shan Plateau is famous also for its **ruby** mines; but the manufacture of artificial rubies has dealt a death blow to the mining of gem stones. The extraction of **amber** and the manufacture of **salt**, both confined in Upper Burma and the Shan States, may also be



Mineral map of Burma

mentioned here. In the south, however, particularly in Tenasserim, there are large deposits of **tin** and **tungsten**, some of which are worked by Europeans. But the most important mining industry in Burma at present is that of **oil**. The oilfields of the country—almost all of them—lie in the old gulf between the Arakan Yomas and the Shan Plateau ; only the Arakan oil-field lies west of the Arakan Yomas. The two leading oilfields, both situated near the Irrawaddy, are those of Singu and Yenangyaung.¹ There are refineries near Rangoon, to which oil is sent by pipe-lines from these fields—at a distance of 300 miles. Burmese oil is said to be of the very best quality, and is used largely for petrol rather than for crude oil. Further discovery of oil in Burma, however, is dismissed as highly improbable. Besides minerals, there are some **pearl** fisheries in the Mergui Archipelago ; but the work is done spasmodically as in the case of gold.

‘Communi-
cations.

The Irrawaddy, which is navigable, for a thousand miles from its mouth, is, with its tributaries, particularly the Chindwin, the principal highway of Burma. The Irrawaddy Flotilla Company maintains regular services up and down the river ; and besides other forms of river traffic, rafts are also in use for carrying timber and other bulk commodities. The railways constitute a supplementary system only. The main line runs from Rangoon to Mandalay along the Sittang Valley and thence to Myitkyina in the northern frontier ; the line was till lately interrupted by the Irrawaddy at Mandalay ; now a new rail and road bridge across the river has established through communication. Another line connects Rangoon and Prome along the Irrawaddy, and a third line connects Rangoon with Bassein across the Irrawaddy Delta. There is railway connection between Rangoon and Moulmein *via* Pegu across the east of the Delta as well. The railways in Burma suffered severely as a result of the World War II

¹ There are eight oilfields in Burma, arranged from north to south as follows Indaw, Nhalaingdwin, Yenangyat, Singu, Yenangyaung, Minbu, Yenanna, Padaukbin, and one, that of Arakan, in the west.

and subsequent insurrectionary activities. A vast amount of reconstruction and repair was necessary and the mileage in 1950 was 1,400 as against 2,059 in 1942. Burma has no railway communication with any of its neighbouring countries. Roads are conspicuously non-existent over the greater part of the country: even Rangoon and Mandalay are not connected by any motor road.

Of the total foreign trade of Burma about 96·5 per cent is seaborne. The principal items of export are **rice, petroleum and petroleum products, timber, cotton, hides and skins, metals and ores, beans, rubber and lac.** Rice alone constitutes about 44 per cent. of the total exports. The principal items of import are **cotton goods, machinery, hardware, coal, silk and sugar.** The port of Rangoon alone handles about 86 per cent., of the total foreign trade. A study of Burma's foreign trade since the opening year of the present century, shows a steady increase every year. The exports are more than 1½ the imports in value. Of the total export trade more than one-third is with India, over one-third with the rest of the Commonwealth countries, and only one-quarter with other countries. Of the import trade nearly one-half is with India, about 3/10 with the rest of the Commonwealth countries, and only one-fifth with other countries. Burma is still largely an undeveloped monsoon country with great possibilities for economic development. Only 20 per cent. of the land is now under cultivation, while 18 per cent., is covered by forests (mostly 'reserved' by the government) and 22 per cent. classed as waste.¹ Much of the remaining 40 per cent. may be suitable for cultivation. The country, moreover, is underpopulated, although quite capable of supporting a large population, if fully developed. One of its many problems, therefore, relates to immigration from the neighbouring countries of India and China, both of which are overpopulated.

Foreign
trade.

Burma's
new posi-
tion and
future
possibilities

¹ Stamp, Asia, p. 342.

Towns of Burma

Rangoon	.	.	..	Capital and Chief Port.
Mandalay			..	Irrawaddy Port.
Bassein	..	..	..	West Delta Port.
Akyab	..	.		Arakan Outlet.
Moulmein			.	Tenasserim Outlet.
Tavoy and Mergui		..	..	Tenasserim Outlet.

The population of Rangoon is 400,000 ; of Mandalay 148,000. Many of the important towns of Burma are river ports as, for instance, the Bhamo, Mandalay, Yenangyaung, Minbu, Prome, Henzada, etc.

Position	<p>THAILAND, known for centuries as SIAM, is an independent kingdom in Indo-China. It has an area of over 200,000 sq. miles and the population is about 17·5 millions. It lies between Burma and French Indo-China. The country falls into four broad topographical regions : (a) <i>Northern Siam</i>, consisting of forested hill ranges and intermediate valleys arranged in a general north and south trend ; (b) <i>Central Siam</i>, practically a vast single plain, bordered on the north by the hills and valleys of Northern Siam, on the east by the hill ridge of Eastern Siam, on the south by the Gulf of Siam, and on the west by the eastern mountains of Burma ; (c) <i>Eastern Siam</i>, a large shallow basin encircled by hills ; and (d) <i>Southern Siam</i>, occupying a rather narrow part of the Malay Peninsula and a small strip of land between Lower Burma and the Gulf of Siam. The country is drained by numerous streams, but there is only one large river—the <i>Menam</i>—which flows through the heart of Siam. For considerable distances, however, the <i>Salween</i> and <i>Mekong</i> form its natural as well as political boundary.</p>
Relief & Natural Regions	

Like the rest of Indo-China, Siam is also under the influence of tropical monsoons. The climate in Siam closely resembles that of India and Burma. Cold season lasts from end of October to February, the hot season from March to May, and the rainy season from June to October. Rain-fall is monsoonal and largely varies from place to place according to relief. The edges of the Korat plateau in the east, receives as much as 120 inches annually, whereas the lower plateau receives less than 60 inches. Central Siam



everywhere receives less than 60 inches. There is a typically dry zone in the interior of Central Siam, similar to that of Burma. The south of Siam in the peninsula, has a short dry season and a small annual range of temperature.

Vegetation About 60 to 70 per cent. of the land area of Thailand is under forest. **Teak** and **sappan** woods are chief products of the forests ; the exploitation of timber is mainly in British hands. **Rice** is the principal agricultural produce, and forms about 87 per cent. of the total export. Other agricultural products are **pepper**, **tobacco**, and **betelnuts** ; some **rubber** and **cotton** are also grown, but not in large quantities, although the production of both can easily be increased.

Minerals. Like Burma, Siam is also rich in minerals ; there are important **tin** deposits in Siamese **Malaya** and the island of Puket ; **wolfram** is also found in Siamese Malaya. Alluvial **gold** is of wide distribution, but as in Burma it is worked in the intervals of agriculture. Other minerals of importance are **coal**, **iron**, **zinc**, **manganese**, **antimony**.

Town & communication **Bangkok**, on the Menam, is the capital and chief port, handling, as it does about 85 per cent., of the total foreign trade. It is connected by rail with Khorat and Buriram in Eastern Siam, and with Chieng-mai or Kiang-mai in the north. The eastern line has now been extended to the French border, and there is a scheme to extend the northern line beyond Chieng-mai to Kian-sen on the Thai frontier. Another line running south-west from Bangkok proceeds to the Malayan border, where it is joined with the Malayan railways so as to enable through trains to run between Bangkok and Singapore. Like the Irrawaddy of Burma, the Menam is navigable for a considerable distance upstream (for about 300 miles from its mouth), and logs from the forests are often floated down the river to Bangkok for export¹. Among the exports the overwhelming

¹ Sometimes these are floated down the Salween to Moulmein in Burma.

importance of rice is noteworthy. Tin and timber are other exports. Another noteworthy feature of Thai national economy is the rapid increase in the output of rubber from the extreme south of the country (Siamese Malaya) ; but it is too early to predict its probable consequences. The imports are cotton goods, machinery, jute, sugar, oil, etc. .

Foreign
trade.

FRENCH INDO-CHINA is now divided into five units—the Colony of *Lower Cochín-China* and the Political Units of *Cambodia*, *Annam*, *Laos*, and *Tonking*.

Extent,
population,
& divisions.

Cochín-China is roughly coincident with the large delta of Mekong. The land is very fertile ; but only 41 per cent. is classed as cultivated, a large part of the delta being unreclaimed marsh. Of the area cultivated more than 97 per cent. is under rice, and the territory is said to supply 35 per cent. of the total rice crop of the whole of Indo-China. Other agricultural products comprise *maize*, *sweet potatoes*, *beans*, *sugar-cane*, *tobacco*, *cocoanuts*, *betelnuts*, *bananas*, etc.; small quantities of *rubber* and *cotton* are also grown. As in Siam, the production of rubber is increasing. **Saigon** (150,000) is the chief port ; its hinterland is said to comprise all the great rice-growing countries of Cochín-China, Cambodia, Southern Laos and a large part of Annam. **Cholon** (20,000) is the chief industrial centre.

Extent &
population.

Products.

Towns.

Cambodia is largely covered with valuable forests, little exploited yet. The soil is very fertile, but the bulk of the land lies uncultivated owing to shortage of labour. **Rice**, however, is the chief product. Other crops that may be mentioned here are *pepper*, *tobacco*, *kapok*, *coffee*, *indigo*, *rubber* and *cotton*. Attempts are being made to increase the output of cotton. **Pnom Penh** (82,000), on the Mekong, is the capital ; it is accessible by ocean-going vessels. But the bulk of the foreign trade passes through Saigon.

Extent &
population.

Products.

Towns.

The Laos is mountainous and believed to be rich in minerals such as *gold*, *lead*, *tin*, and *gemstones*. The mountains are covered with valuable **teak** forests, and logs are

Resources.

floated down the Mekong to Saigon for export. **Vientiane**, on the Mekong, is the capital.

Annam is the eastern most of the Associated States. **Rice** is naturally the chief product ; other products include pepper, tobacco, sugarcane, etc. But a special feature of interest is the production of **silk** and **tea**. The capital is **Hue'** (60,600), and its port is **Tourane**. But the largest town of Annam is **Binh-Dinh** (157,000). Since the narrow coastal strip is divided by mountain spurs into a number of separate basins, Northern Annam is served by the port of Haiphong, Southern Annam by Saigon, and only Central Annam by its own port of Tourane.

Tonking is roughly coincident with the valleys and delta of the Red River and its tributaries. The country is mountainous. There are abundant mineral deposits, and *mining* is important. **Rice** is naturally the chief crop, grown mainly in the Delta region. Other agricultural products are *maize*, *sugar-cane*, *arrowroot*, *tea*, *coffee* and *tobacco*. **Silk** is also produced in large quantities. **Hanoi** (100,000) is the chief town of Tongking and capital of Indo-China. **Haiphong** is the chief port ; its hinterland comprises Tongking Northern Annam and Northern Laos.

FEDERATION OF MALAYA is a peninsula forming the south-eastern extremity of the Asiatic mainland. Geographically it may be said to cover considerable tracts of Siamese and Burmese territories. The total area of the federation is about 50,680 sq. miles. The State came into existence on 1 Feb. 1948. The peninsula is highly mountainous, but at the *Isthmus* of Kra there is a gap. The climate is Equatorial, but marked by transitional phases. Rainfall is well distributed throughout the year and the annual average rainfall is over 100 inches. The climate is hot and humid throughout the year, without any appreciable seasonal variations except, perhaps, in the eastern coast. The natural vegetation of Malaya is essentially lofty evergreen forest. Mangrove Swamps are found on the flat western coast. On the sandy tracts of the east coast

Casuarina trees abound. The mountains are naturally clothed with dense lofty evergreen forests. The principal agricultural products are **rubber, cocoanuts, and rice; pepper, pine-apples** and *palm oil* may also be mentioned. Rubber is the most important cash crop in Malaya. Rubber plantations occupy about 3½ million acres out of a total cultivated area of 6 million acres. Malaya is famous for **tin**, but there are other minerals, too. The peninsula is divided into a number of political units : (a) **The Straits Settlements**, comprise Province Wellesley, the island of Penang, the territory of Malacca, and the island of Singapore, together with the Cocos or Keeling Islands, the Christmas Island and the island of Labuan. (b) **The Malaya States**, consist of the native Sultanates of Perak, Pahang, Selangor, and Negri Sembilan. (c) **The States** of Perlis, Kedah, Kelantan, Trengganu, and Johore. Population in 1950 was 5,226,549 of which 2,427,834 were natives. The Malays belong to the Oceanic Mongol race (or races?) But the population consists of large numbers of Chinese and Indians, besides, of course, a much smaller proportion of Europeans. The Chinese are largely permanent settlers ; the Indians, mostly from the Deccan, are mainly temporary immigrants, working on the rubber plantations. There is through railway communication between Singapore and Bangkok across the Johore Strait and along the more fertile western section of the peninsula ; numerous branch lines cover this part of Malaya like a complicated network ; another trunk line, separating out at Gemas from the Singapore-Bangkok line, proceeds through the eastern section of the peninsula to Siam (since 1932) ; this line touches the port of Khota Bharu on the east coast. A new system of metalled roads, with a total mileage of 1,000, has also been constructed. There is a project for the construction of a ship canal at the Isthmus of Kra.

Products.

Minerals.

Political Divisions.

Population.

communications.

Rubber and Tin are the most important exports of Malaya. It is interesting to note that these two commodities made possible the development of the country. The principal buyers of the above commodities are the United Kingdom, The United States of America, Canada, India

etc. The imports are foodstuffs and manufactured goods which mainly come from the U. K. and other Commonwealth countries and the U. S. A. **Kuala Lumpur** is the capital and the chief port is **Port Swettenham**. **Penang** is also a port but it is specially noted as an airport. **Malacca** is another port.

The island of **Singapore** lies at the southern end of the peninsula, from the mainland of which it is separated by the narrow Johore straits, only about a mile wide. The island is 27 miles long and 14 miles wide from North to South. It became a separate British crown colony in 1946. The southwest of the island is hilly but the eastern part is flat. There are rubber plantations and cocoanut groves in the island. It is the biggest port in S. E. Asia. It is also a big entrepot and a coaling station. It is also a big financial centre.

THE EAST INDIES OR THE MALAYA ARCHIPELAGO

Introductory.—To the south-east of the Asiatic mainland there is a deep channel between the islands of Bali and Lombok, which, according to the great naturalist Wallace, separates the Asiatic and Australian flora and fauna. This the famous ‘**Wallace’s Line**.’ But while Wallace’s line passes through the Strait of Macassar, the channel separating the two continents diverges eastward through the Molucca Passage. It is said that if the sea-bed were elevated some 100 fathoms, the islands west of this Channel would be continuous with Asia and those east of it with Australia. The curious term, **East Indies**, is rather vaguely applied to the former group with the exception of those islands which belong to China and Japan. More indefinitely still, East Indies are often regarded as synonymous with the **Malay Archipelago**. The geological structure of these islands is very complicated, and authorities are much at variance with regard to it. Brouwer and many others believe that the main tertiary folds running down

Line of
separation
between
Asia &
Australia.

East Indies
& Malay
Archi-
pelago.

Burma, Sumatra and Java are continued in such a way as to exclude New Guinea, which, on the contrary, stands on the edge of the hypothetical Australian massif. Gregory, on the other hand, thinks that the principal tertiary folds are continued through New Guinea, which, therefore, can not be regarded as part of the Australian massif. Brouwer's is, more or less, the orthodox view ; but while he would not go beyond the Sunda Islands as marking the eastern limit, on land, of these folds, many others would place that limit farther east on the Tanimbar and Kei Islands. The folds are then said to swing west in a great curve through the Buru and Ceram Islands. The whole area, however, naturally falls into two distinct climatic zones: (Malaya) Sumatra, Java, Borneo, Celebes, Moluccas, Timor and even New Guinea lie in the region of Equatorial Climate ; and the term, Malaya Archipelago, may be applied to this group only. (Indo-China) and the Philippine Islands, on the other hand, lie north of this group and have certain features in common. The term, East Indies, may be used in a wider sense to denote both the groups.

Geology.

Topography
& climate.

INDONESIA.—Formerly known as Dutch East Indies, it is now a sovereign independent state, comprising four large islands of Java, Sumatra, Borneo and Celebes, besides many small islands surrounding the country. It has an area of 735,267 square miles. The estimated population in 1950 was 78 millions.

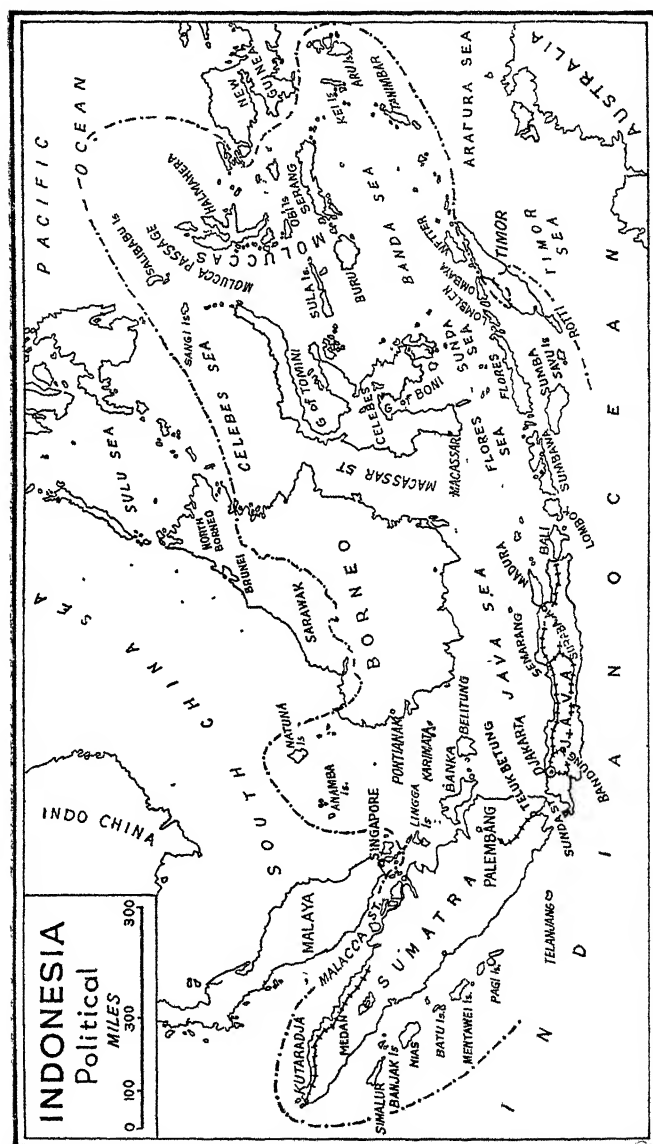
Extent,
Popula-
tion, &
Division.

It is usually divided into two parts : (a) *Java* and *Madura*, and (b) The '*Outer Territories*'. From the commercial point of view, Java, with its satellite island Madura, is the most important island in the whole group. The soil is very fertile, rainfall is moderate and there are abundant facilities for irrigation. The principal products are *rice*, *sugar*, *tobacco*, *coffee*, *tea*, *oil-palms*, *cinchona*, *kapok*, and *pepper*. But the cultivation of sugar-cane has recently shown a decline owing to over-production in other

Java &
Madura.

Products.

¹ On this fascinating subject the ambitious student may be referred to H. A. Brouwer, *The Geology of the Netherlands East Indies*, and J. W. Gregory, 'The Banda Arc', *Geographical Journal*, Vol. LXII, 1923, pp. 30-32.



countries and the drop in the demand from India. There is a fair output of *petroleum* from Java ; and Indonesia, we are told, enjoys a virtual world monopoly in cinchona, kapok, and pepper. **Jogjakarta**, in the hills, famous for tea plantation, is the capital of the Republic. **Batavia**, on the north-west of Java, was the old capital of the Dutch empire ; owing to the silting up of its old harbour, a new one, called *Tandjong Priok*, has been built six miles away ; it has a considerable *entrepôt* trade. **Samarang** and **Sourabaya** are important road-steads enriched by artificial harbours. **Chilachap** or Tjilatjap, in the middle of the south coast, is the only natural harbour in Java.

The 'Outer Territories', comprising the rest of the Republic of Indonesia, together have a population density of only 30 to the sq. mile. **Sumatra** is a large island, Sumatra. offering abundant facilities for development. It has a mountain backbone in the west and a progressively widening plain in the east. Large areas of the plain are, however, covered by marsh. Its chief products are *coffee, tobacco, tea, palm-oil* and *rubber*. But Sumatra is richer than Java in minerals, especially in *coal* and *petroleum*. *Tin* is obtained in large quantities from the islands of Banka and Billiton or Belitong, off the east coast. The island is being rapidly developed ; for the population of Java seems to have reached the saturation-point. **Belawan Deli, Palembang** and **Padang** are the principal ports of Sumatra. A new harbour called *Emmahaven* has been constructed five miles away from Padang for the export of coal from the Ombilin coal-field ; the harbour and the coal-field are connected by rail.

Products.

Ports.

Other Islands.

BALI adjoining the eastern extremity of **Java**, and resembling that island in physical features, climate and vegetation as well as in economic development, is called 'Little Java' and 'the jewel of the East.' **Lombok**, separated by a deep channel from Bali, has a different flora and fauna. **Celebes**, separated from Borneo by the Strait of Macassar, is exceptionally fertile, and has a large produce of *copra, spices*, and *Macassar oil* (used in cosmetics) ; and it is also known to have very large deposits of *iron ore*.

Macassar, in the south, is the chief port of Celebes. **Borneo**, still very little developed, is sure to make much headway in near future as *coal* and *oil* in considerable quantities have been discovered there. The **Moluccas** or Spice Islands, separated from Celebes by the Sea of Celebes and linked with New Guinea by a festoon of islands, are still famous for *spices*, especially cloves and nutmegs. All these islands still bear ample testimony to the inhuman treatment the natives received in the hands of the early European adventurers, and many of the smaller islands now lie absolutely uninhabited.

Extent & Divisions.	<p>British Borneo comprises three political units : (a) <i>British North Borneo</i>, governed by a Governor under the British crown ; (b) <i>Brueni</i>, a little British Protectorate administered by a native Sultan at the advice of a British Resident ; and (c) <i>Sarawak</i>, ruled by an English Rajah since 1842, has recently been put under British rule. <i>The</i> chief commercial products are <i>rice, gums, sago, coffee, coconuts, pepper, spices, jelutong, timber, rubber, guttapercha, rattans, camphor</i>, and a tanning extract called <i>cutch</i>. Some <i>coal, oil, iron</i> and <i>gold</i> are also exported. The capital of</p>
Products	<p>British North Borneo is Sandakan on the north-east coast ; it has a fine natural harbour. There is another fine harbour at Kudat bay on the north. Kuching, on the Sarawak River, about 23 miles from the sea, is the capital and chief port of Sarawak. Miri is the headquarters of the Sarawak Oilfields, Ltd.</p>
Towns.	

The Republic of the Philippines, together with the Sulu Archipelago and the island of Palawan, were purchased by the U. S. A. from Spain in 1898. In 1935 they were constituted as a Commonwealth and in 1946 they have been granted full independence.

Position.	<p>The Phillippine Islands cover an area in the western Pacific of about 115,600 sq. miles. Although they comprise more than 7,000 islands, only 2,773 have names and only 462 have an area of one square mile or more. The northernmost island is 65 miles from Formosa and the southernmost 30 miles from Borneo. Eleven islands Luzon, Mindano,</p>
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Samar, Negros, Palawan, Panay, Mindoro, Leyte, Cebu, Bohol and Masabete account for 95 per cent. of land area in the Philippines.

The Philippines are mountainous and in the larger islands the ranges, volcanic in origin, are continuous and reach a height of 10,000 feet. They lie outside the equatorial belt and feel the influence of Asiatic monsoons. Insularity and latitude combine to make the climate of the Philippines mild and equable. Rainfall varies between 40 and 180 inches and occurs mainly from July to September. The Eastern part has rainfall throughout the year with a maximum in winter. The Philippines are subject to severe cyclones known as Typhoons. Large rivers are few, small streams many.

Relief & climate.

The 1948 census gave the population of the Philippines as 19 millions, with Fillpinos numbering 15,800,000. Of the foreign population the Chinese led with 117,000. There are 43 ethnographic groups, speaking 87 languages and dialects.

Population

The Philippines are primarily agricultural, though little more than 12 per cent of their area, half of which is wooded, is cultivated. Eighty per cent. of the population depend on agriculture for their livelihood. About 45 per cent of the cultivated area is under rice and 20 per cent under maize. The food crop produced is inadequate to meet the home demand. The islands before the war ranked fifth in the world's sugar production, have one of the world's great stores of timber and enjoy virtually a world monopoly of hemp. The chief commercial products are *sugar, copra, tobacco, cigars, coconut oil, and Manila hemp*. Some minerals are found, notably *gold*. **Manila** is the capital and chief port. The bulk of the trade—roughly 70 per cent., is naturally with the U. S.A. Coconut, copra and Manila hemp account for 90% of all exports.

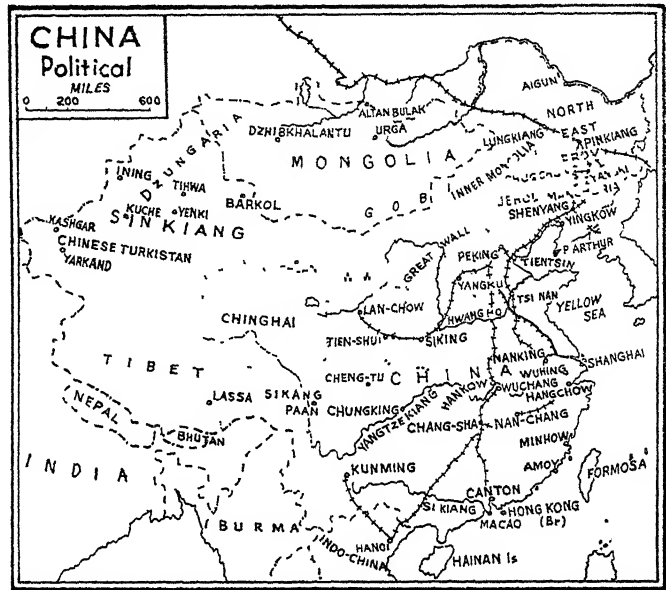
Products.

THE FAR EAST

CHINA proper, excluding Manchuria and the Outer Territories, has a total area of 1,532,800 sq. miles, *i.e.*, almost the same as that of India exclusive of Burma

Extent & Position.

(1,542,600 sq. miles). But 'Greater China', which comprises Manchuria, Mongolia, Sinkiang or Chinese Turkestan, and Tibet, has the enormous extent of 4,278,352 sq. miles. Viewed broadly, China proper lies to the east of



Political map of China

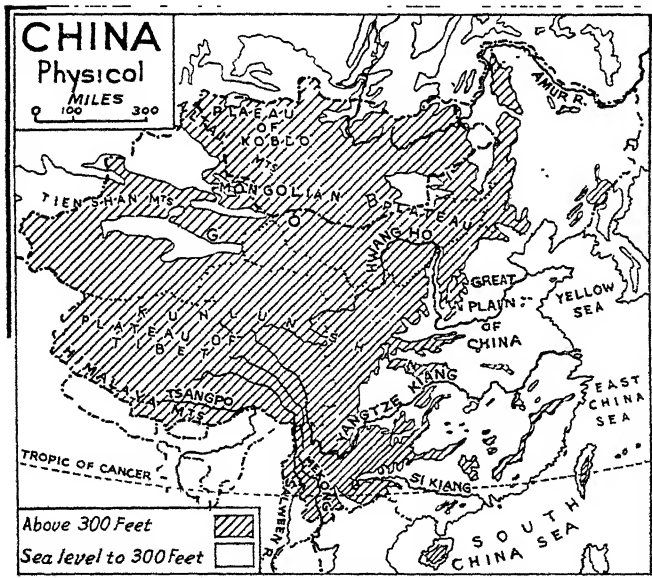
Relief.

the central mountainous triangle of Asia. Part of the Mongolian Plateau penetrates the Chinese country in the north-west, and in the south-east lies the Plateau of Yunnan. The remainder of China proper consists almost entirely of the three great river basins—those of the Hwang-ho, the Yangtze-Kiang, and the Si-Kiang, corresponding, in order, roughly with North China, Central China, and South China. The basins of the Hwang-ho and the Yangtze-Kiang are separated by the Tsingling Shan, and between the basins of the Yangtze-Kiang and the Si-Kiang lie the South China plateaus.

Climate.

This tripartite division of the country, we have seen, corresponds to its principal climatic zones as well. For its latitude China becomes intensely cold in winter, and suffers from strong dessicating (dry) winds rushing

towards the sea from the icy heart of Asia. In North China the rivers usually become frozen, and in Central China large areas are not infrequently under snow ; but in South China snow and frost are rare. These out-blowing winds, being dry, give rise to violent dust storms, especially in the north ; but after picking up some moisture from the sea they bring in a little winter rain in the Yangtze Delta. In summer, temperatures are, on the whole, fairly high and uniform all over the country, and rain-bearing monsoon winds distribute moisture throughout the land ; but rainfall in North China is comparatively low—rarely rising above 40" annually.



Physical map of China

Owing to the great pressure of population the natural vegetation of China has been almost completely wiped out, the only remaining forests—for forests seem to be its natural vegetation—being those of the Tsinling and Central Mountains, the Nan Shan or Nanling Mountains, and the plateau of Szechwan and Yunnan. In the south the typical vegetation is tropical monsoon forest of hard-

Natural
vegetation.

woods ; elsewhere it is of mixed conifers and deciduous and evergreen hardwoods ; towards the plateau of Mongolia the natural vegetation is grassland. The Chinese are now 'cultivating' forests in a few places, especially in Fukien and Chekiang ; but forestry is there naturally in its earliest infancy now.

Agriculture.—China is mainly an agricultural country and the method of cultivation is primitive. The pressure on land is also very great. Half of the country is too dry or too cold for cultivation, one-fifth too mountainous and more than 1/67th part is absolutely barren. Total arable land in China is estimated to be 192,000 sq. miles. The holdings are generally small and agriculture in China is intensive rather than extensive. Under the new regime re-distribution of land has been carried out and scientific methods have been introduced. But, it is obvious, that agriculture can not sustain such a huge population (450 millions) and the future economic prosperity of the country is intimately bound up with industrial development.

Areas under Principal Crops in China

(Percentage of total cultivated land)

Millets & Sorghums	..	20	Rice	..	..	28
Cotton	..	2	Wheat	..	..	21
			Others crops	..	..	29

In Southern China *rice* is the principal food crop ; in Central China both *rice* and *wheat* share the leading position, and in North China *wheat* is dominant.

Production of Crops 1950

(In million metric tons)

Rice	..	..	50	Maize	..	..	6.4
Wheat	..	..	20	Soyabeans	..	..	5
Barley	..	..	7	Peas	..	..	3

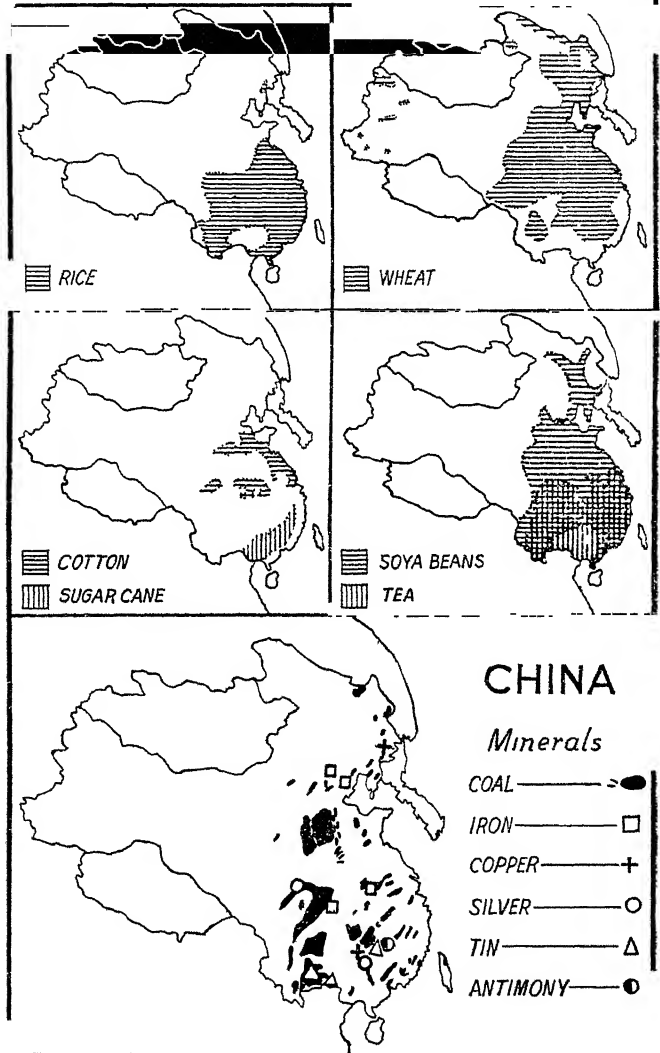
Millets are grown in the drier regions, especially in the north-east ; but *soya-beans* are steadily invading the areas under millets. In 1950-51 the production of cotton was estimated at 2,000,000 bales (of 480 lbs. net). The bulk

of the *cotton* is grown in the central and northern parts ; but Chinese cotton is of poor quality. *Sugar* is grown in the south, and *maize*, *peas* and *beans* in the north. Tea is grown on the southern and western hills. Besides a large variety of *vegetables*, another important plant largely cultivated is the *mulberry* tree for feeding the silk-worms. Stock-raising is also widely practised. There are numerous *pigs* in China, and fat pork is said to constitute a favourite foodstuff. *Sheep* are also reared, primarily for wool ; but *Chinese* wool is said to be of inferior quality. *Cattle* are used in ploughing as in India and also as draught animals, besides *horses* and *mules*. *Poultry* are important ; eggs form one of the chief items of export.

The reeling and weaving of silk have been a tradition in China from olden times. The lower Yangtze and Si-Kiang valleys are centuries-old areas of silk farming. China is the largest producer of silk, but in the export business her share is relatively very small. The country is distinctly backward, much like India, in manufacture, and that may be a reason for the overwhelming pressure of population on land. The dying and dead village industries of both China and India are a strong evidence of the exploitation of these countries by the great industrial nations of the West. As in India, hand looms are still to be found in most of the rural areas of China. In some of the cities such as Canton and Shanghai, cotton, wool and silk mills have been established. Flour mills are also increasing. At Han-yang, near Hankow, are large iron works, supplied with ore from mines at Tayeh about 60 miles distant. The tanning industry has factories at Kiangshu, Hopei and Shantung.

Minerals.—China, we have already noted, is rich in various minerals, especially in **coal**, much of which is of excellent quality. In North China there are a number of small coalfields in the neighbourhood of Peiping, and a fairly big one to the north-east of Tientsin. In the west of the mountains of Shantung are large deposits of both bituminous and anthracite coal. Towards the interior

CHINA *Agricultural Products*



Map of China showing important agricultural products and minerals

of the country there are enormous coal measures—both anthracite and bituminous—in the southern portions of the province of Shansi, the anthracite alone covering an area of some 13,500 sq. miles, and it is believed that this field alone contains 80 per cent of the total coal reserves of China. There are smaller fields in south-eastern Hunan, eastern Szechwan and northern Yunan. **Iron** is found in several places, particularly in Hopei, Shansi, Shantung and Szechwan. The ores of Shansi are said to be of very good quality. But the largest deposits of iron are in Manchuria, which is now partially exploited. The Tayeh iron ore deposit near Hankow is one of the richest fields of the world. There are large deposits of **copper** in Yunnan. **Silver** and **tin** are also found in Yunnan. Hunan is noted for **antimony**, of which China was for some time the leading producer. Large quantities of **wolfram** are also obtained from Hunan, Kwantung and Yunnan in China. Much of China's mineral resources still lie untouched or little exploited, and the reason ordinarily adduced for it, is the want of adequate means of communication.

Communications.—The mountainous relief of the country has retarded development of Roads and Railways. Specially, communication from east to west has been rendered very difficult. The Great Plain of China, which Communi-
has much in common with the Great Plain of Hindoostan, cation.
affords, however, excellent facilities for communication. An admirable canal, 700 miles long, constructed in the seventh century A.D., starts from Hangchow, and, after crossing both the Yangtze-Kiang and the Hwang-ho, Waterways.
terminates at Tientsin, thus establishing communication nearly throughout the whole of the Plain. The numerous rivers, large and small, such as the Yangtze-Kiang, even the Hwang-ho, the Pei-ho, the Meiling Pass and their numerous feeders, serve, more or less, as supplementary waterways over the Great Plain. But communication is difficult between the east and the west of China. Of the three great rivers—the Hwang-ho, Yangtze-Kiang and Si-Kiang—only the Yangtze-Kiang may be described as an admirable water-course, being navigable for more than

Railways.

1,000 miles from its mouth by ordinary steamers and for 680 miles up, *i.e.*, as far inland as Hankow, by ocean-going vessels. Between Ichang and Chungking commodities are exchanged by means of small craft. Railway lines now link Hangchow and Shanghai with Tientsin and Peiping, Hankow with Tientsin and Peiping, and Peiping with Moukden, Vladivostok and Harbin. Another line starts from Peiping and terminates at Paotao in Inner Mongolia *via* Kalgan. Hongkong is now connected by rail with Hankow *via* Canton, and this, as noted elsewhere, has now made it possible to travel by rail from 'Calais to Canton' as the phrase is commonly used. Regular air services now link up several cities of China.

Ports.

The foreign trade of China, like that of India, is nearly all sea-borne, and it passes through the so-called '**treaty-ports.**' These seaports are **Shanghai**, Hangchow, Ningpo, Wenchow, Foochow, Amoy, Swatow, and **Canton**; these are located on the east coast between the Yangtze-Kiang and the Si-Kiang. Shanghai is by far the most important seaport of China. The chief Yangtze ports are Chinkiang, Nanking, Kiukiang, Hankow, Ichang and Chungking; **Peiping** was the old capital of the Chinese Empire; its port is Taku, a treaty port. **Tientsin**, on the Pei-ho, is the inland port of Peiping; it, too, is a treaty-port. The bulk of the foreign trade, however, passes through the three ports—Shanghai, Canton, and Tientsin.

Foreign Trade.—China's share in the world trade is very small. The chief exports are silk and silk fabrics, sugar, tungsten, antimony, soya bean and its products, tea and cotton. The principal imports are machinery, iron and steel, cotton textiles, jute, petroleum etc. The greater portion of the trade is, at present, with the Soviet Union.

HONG KONG has been in British hands since 1841, and is in control of a large part of the trade passing through the south of China. With the improvement of conditions in China its importance is likely to wane. **Victoria** is the chief town.

Macao, at the mouth of the Canton River, is a decaying town under Portugal.

MANCHURIA, physically, consists of three parts. There is a *great central plain*, narrow in the south, drained by the river Liao ; broad in the north, drained by the river Sungari, a tributary of the Amur. There are two mountain ranges running north and south—the Khingan Mountains in the west and a continuation of the Korean Highlands in the south-east. The climate is similar to the Laurentian type (Chap.—III). The rainfall is monsoonal but the country has extremes of temperature. The mountainous borders are forested, with the thickest forests and the best timber on the eastern mountains. The most valuable timber is the Manchurian pine. The plains exhibit close resemblances to the Canadian prairies in relief and climate. Agriculture is rapidly developing here. The chief cultivated products are *millet, wheat, soya beans* and *rice*. Minor crops are *barley, cotton, tobacco* and *sugar-beet*. There are possibilities of the development of the cultivation of *cotton*. *Coal* and *iron ore* are the important mineral products of Manchuria. The principal coal-field is at Fushun, 22 miles south-east of Moukden. *Gold* is worked by native methods in several places but the output is not great. The progress in manufactures is slow and is most marked in the Liaotung peninsula and in the zone of the South Manchuria Railway. Extraction of oil from soya beans, cotton manufacturing, iron smelting, and silk reeling are the chief industries. The railways have played a remarkable part in the development of Manchuria. The three chief systems are—(a) the Chinese Eastern in the north, (b) the South Manchuria in the south-east and (c) the Peking-Moukden in the south-west. The chief exports are soya beans, bean cake and oil, coal, timber, sorghum, etc., and the chief imports are cotton piece-goods, wheat, flour, machinery and other manufactures.

Relief.

Climate and vegetation.

Agriculture.

Minerals.

Manufacture.

Railways.

Trade.

MONGOLIA is a plateau, west of Manchuria, comprising a total area of 1,367,953 sq. miles, and surrounds the deserts of Gobi. It is inhabited by nomadic Mongols.

A considerable part of it, called 'Outer Mongolia' has been under the suzerainty of Russia since 1924, and a part of 'Inner Mongolia' now forms part of the state of Manchukuo. **Maimachin**, on the Russian frontier, is the chief town.

SINKIANG, also known as Chinese or Eastern Turkestan, has an area of 550,579 sq. miles, and occupies the Tarim Basin. It is also a plateau with a desert in the interior ; but intensive cultivation is practised in the oases. **Kashgar** and **Yarkand** are the leading towns ; caravan trade across the Pamirs as well as with China is carried on.

TIBET, an agglomeration of lofty tablelands, has a total area of 463,320 sq. miles. **Lhasa** is the capital, and **Shigatse** and **Gyangtse** are the outposts for trade with India.

JAPAN

JAPAN proper, on **NIPPON** as it is called, consists mainly of the four islands—Honshu (or Mainland), Kyushu, Shikoku and Hokkaido, with a total area of 149,000 sq. miles and a population in 1950 of 83,200,000. By the term, Old Japan, is however meant the first three islands mentioned above. The total extent of her overseas possessions before the 2nd World War was only 112,000 sq. miles, and they consisted of the southern half of the Sakhalin Island, called Karafuto, the Peninsula of Korea or Chosen, the island of Formosa or Taiwan, besides the leased territory around the port of Dairen and a large number of mandated islands in the Pacific. But she has lost them now. The position of Japan is, in many respects, analogous to that of Great Britain ; for while Britain lies to the west of Europe (or Eurasia) and thus commands the entrance to the Atlantic Ocean, Japan—often called the 'Britain of the East'—lies to the east of Asia (or Eurasia) and guards the entrance to the Pacific. But she is nearer the Equator than the British Isles.

Extent &
Population.

Japan
"Britain of
the East."

Japan and Great Britain

Points of Resemblance

Great Britain	Japan
1. It is a group of islands lying to the windward side of a populous continent—Europe.	1. It is a group of islands lying to the windward side of a populous continent—Asia.
2. It has a highly indented coast line.	2. It has a highly indented coast line.
3. Its western shores are washed by the warm gulf stream drift.	3. Its eastern shores are washed by the warm Kuru-Siwo.
4. It is a highly industrialised country and has a huge density of population	4. It is a highly industrialised country supporting a large population.

Points of Contrast

1. The greater part of the country consists of low lands	1. The land mass is extremely mountainous
2. The rivers are long and sluggish.	2. The rivers are short and rapid
3. The climate is equable.	3. The climate is extreme.
4. Rainfall occurs throughout the year due to the westerlies.	4. Rainfall occurs mainly in summer

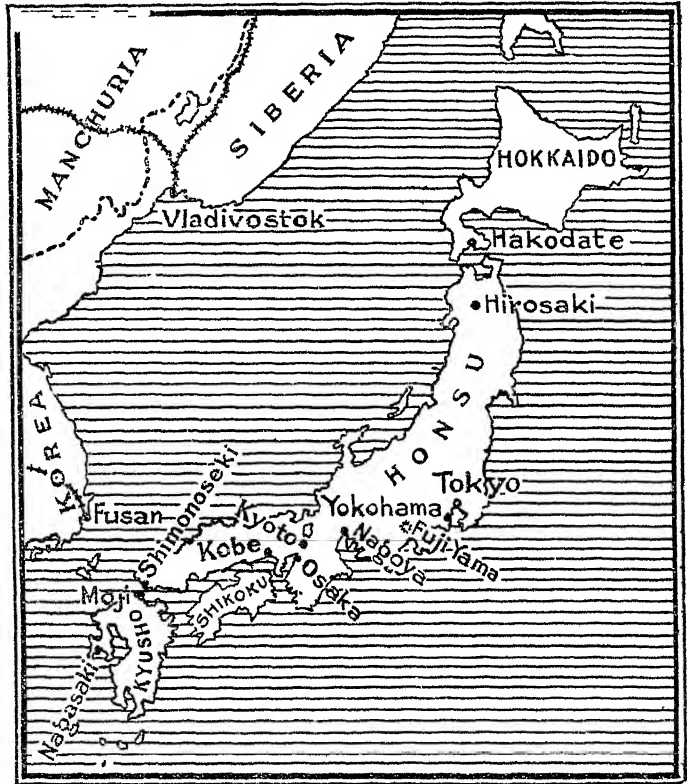
The surface of Japan is extremely mountainous, and the arrangement of the mountains seems to be very irregular ; but the main mountain-chains, forming two parallel arcs, run along the entire length of the country—the one along the east coast, the other along the west coast. The mountains are, no doubt, interspersed with lowlands and valleys, none of any considerable extent, and even these lowlands are often traversed by mountains of volcanic origin. Only 16 per cent of the entire area is available for cultivation and settlement.

Relief.

In climate, too, there is at least a superficial analogy between Japan and the British Isles ; for while the British Isles have a 'west-coast' climate and enjoy the warming influence of the North Atlantic Drift, Japan has an 'east-coast' climate, and is under the warming influence of the Kuru Siwo. But while rainfall in the British Isles is determined by the pleasant westerly winds, that of Japan is mainly determined by the summer monsoon, and in

Climate.

winter she is at the tender mercies of the cold dessicating winds from the heart of Asia. These winter winds, after crossing the sea, bring heavy precipitation in the form of snow to the western coasts and mountains of Japan. The eastern parts are usually dry in the cold season.



A General Map of Japan

Rainfall in summer is rather heavy in the south and east, but light in the west. Summer temperatures are rather high throughout the country, and more so in the south ; but in winter it is often bitterly cold. Just as the warm Kuru Siwo on reaching Japan from the south, divides into two currents, so also a cold current coming from the opposite direction, divides into two on reaching the

northern shores. The western branch of the Kuru Siwo flows close to the shore and thus mitigates the severity of the winter winds, but the eastern branch flows at a distance from the shore. The eastern branch of the cold current, however, flows between the shore and the eastern branch of the Kuru Siwo and thus keeps that shore relatively cold. The natural vegetation of Japan is forest; Natural conifers and cold temperate forests predominate in the north, temperate forests in central Japan, and sub-tropical forests in the south. vegetation

Agriculture.—Japan is a populous country but the amount of cultivable land is limited. Therefore, the pressure on soil is very great. The Japanese are skilful farmers and practise intensive cultivation. *Rice* is by far the most important food crop, and occupies even more than half (or, actually 40 per cent ?) the total area under tillage. Other important grains are *rye*, *wheat*, and *barley*. The *soya bean* has also been introduced in recent years. Small quantities of wheat and barley are also grown. *Tea* is certainly important, but nearly all of it is green tea and there has been for the last few years a steady decrease in acreage under it. Production of silk is an important occupation in Japan. It is carried on by farmers as an adjunct to crop-raising with the help of their wives and children. Much skilled manual labour is necessary. Japan's output of silk, in 1950-51, was about 148,100 bales of which 94,451 bales were exported. Agriculture.

Fishing is a very important occupation in Japan. The waters surrounding the country have an abundance of fish. Meat animals are rarely found in Japan and the Japanese are credited with eating more fish than any other people in the world. Cod, Herring, Salmon, etc., are the principal catch. Long, indented coasts with many natural harbours are very advantageous for fishing. Before the World War II, Japanese catch represented two-thirds of the world's fishing.

Japan is rather poor in minerals. Unlike those of Britain, her resources in coal and iron are small, and hence

Minerals. she lacks the essential basis of modern industry. Her present average output of **coal** is about 40 million tons a year. But the coal-seams are often highly disturbed, owing, no doubt, to frequent seismic disturbances¹ The principal coalfields are in Kyushu and Hokkaido, containing, as they are believed to do, about 66 and 17 per cent., respectively of the total coal reserves of the country. There is a small coalfield in Honshu. But despite a small and decreasing export mainly of bunker coal, she has got to import a considerable amount every year. The mountainous nature of the country has encouraged the Japanese to make use of hydro-electric power largely as a substitute for coal.

Water-power. The development of water power is notable. At the present time Japan ranks fourth in this respect in the world. Japan is also now self-sufficient in the manufacture of electrical machinery. The principal **oilfields** are on the north-west coast ; but the total output is only about 30 per cent of her actual requirements, and large quantities of oil are, therefore, imported—chiefly from California, the S. E. Asia, and Mexico. The only **iron** mine of any importance is Kamaishi, and Japan depends mainly upon China for the raw materials of her steel industry. Some **gold** and **silver** are also found, but the output of both is insufficient for her own requirements. Gold and silver mostly occur together, and Saganoseki is the chief centre. It is only in **copper** that she holds an important—actually the fifth—place. The ores are widely distributed, and the principal mines are Ashio, Besshi, Kosaki, Hitachi, and Saganoseki. Other important minerals include *lead*, *tin*, *sulphur*, etc., and there are large deposits of **kaolin**.

Manu-
facture

The **industrial revolution** in Japan had begun in 1868 or thereabouts, but it was not till the Sino-Jap War of 1894-95 was over that Japan began to make rapid strides in modern manufacture. Modern Japan may thus be said to be a creation of the last six decades or so. The most amazing developments have been made in the cotton-spinning industry. It is all the more remarkable, as Japan

¹ Japan, we are told, experiences no less than 1,500 shocks a year on the average.

has had to depend upon foreign supplies of raw materials Cotton and machinery. The cotton comes from India, U. S. A., industry. China and Egypt. The chief centres of this industry are Osaka, Nagoya, Kobe, Wakayama and Mie.

In respect of silk manufacture Japan occupies a very important place. The silk industry is able to obtain ample Silk. supplies of raw material at home and the products face less keen competition in the world market. *It is the principal silk-exporting country in the world.* Much attention has lately been given to the rapid expansion of the Rayon or artificial silk industry. It has become one of the most important industries of Japan.

The woollen industry in Japan was started after the World War I. Osaka and Nagoya are the chief centres. Wool is imported from Australia and China to be turned into the finished products at Osaka and other centres. This industry has to depend entirely upon imported raw materials. The iron and steel industry is not an industry of major importance in Japan, but because of its vital importance in the industrial system and in many schemes of national defence the methods that have been used to westernise it deserve special consideration. To no other Iron & Steel industry. industry has the Japanese government given so much assistance and in no other industry has the assistance produced such meagre results. The Iron and Steel industries of Japan suffer from two great disadvantages—(1) lack of iron-ore, (2) lack of coal. This industry has to depend on Manchuria, China and India for materials. The first Iron and Steel factory in Japan was started at the port of Yawata on the Island of Kiyushu in 1901. The iron ores found in Kamaishi are low in iron content. Domestic coal is also unsuitable for Coking purposes unless high grade coal is mixed with it. The industry is based upon a weak economic foundation.

Ship-building is also a heavily subsidized industry in Japan. Warships and high grade merchant vessels are built at Kobe and Nagasaki. To-day, rubber industry is of much importance ; so also is match industry. In paper-

making and chemicals, the Japanese are well advanced. The chemical industry is a flourishing industry. Toy-making, porcelain wares—, and enamel wares—making, manufacture of matting, etc., are the important cottage industries of Japan.

Pressure of population. The progress of the Japanese industrialisation depends very largely upon the country's ability to expand foreign trade. Japan is very poor in raw-materials, and has little besides her labour on which to build her industrial system. The rate of increase of population in Japan from the Sixties and Seventies of the last century has been alarmingly high and within the last few years it became serious. Japan has not enough food to feed this increasing population. Mr. J. E. Orchard points out that "pressure of the population on subsistence is the basis of the present economic unrest within the country. Search for relief is the keynote of Japan's domestic and foreign politics."¹ Japan tried to solve the problem by becoming "the England of Asia", making "every effort for the encouragement of industrialisation and distributing her manufactured goods to all the markets of the world in exchange for food-stuffs and raw materials." Japan also tried to colonise in Manchuria and the islands of S. E. Asia, but emigration did not supply a solution to the population problem of the country. Japan tried in the past decade to secure the economic control of the neighbouring areas to solve her food and market problems. The first objective was Manchuria. After making her position quite secure in Manchuria Japan invaded China in 1937 and succeeded temporarily in establishing herself over the greater part of that country. In the beginning of the last world war she captured the whole of S. E. Asia. But her defeat has dealt a death blow to her territorial ambition.

The bulk of the foreign trade of Japan passes through the three leading ports, **Yokohama**, **Kobe**, and **Osaka**.

¹ J. E. Orchard—"The pressure of population in Japan, Geog. Review. Vol XVIII, July 1928. (Quoted from Stamp's Asia).

Tokyo is the capital of Japan ; its chief port is **Yokohama**, and Yokosuka, twelve miles south of Yokohama, is the government dockyard. **Osaka** is the 'Manchester of Japan'—its chief seat of the cotton-spinning industry ; **Kobe**, the great silk centre of Japan, may be regarded as the chief port of Osaka as well. **Nagoya** is the chief centre of porcelain and allied industries. **Kyoto** is the old capital. **Hakodate** is the port of shipment for coal from Hokkaido. **Otaru** is the chief port of Hokkaido. **Kushiro** is an important port of Hokkaido. **Moji**, and **Shimonoseki** are also notable ports.

Towns
and Trade
Centres.

Foreign Trade—The prosperity of Japan depends on her ability to import raw materials and to export them as finished products. Japan is always struggling hard to balance her imports and exports and to keep a favourable balance of trade. As a result of World War II Japanese trade suffered a great set back. Recently Japan has increased her volume of trade to a large extent. Japan trades with almost all the countries of Asia, U. K., U. S. A., Canada, Mexico, Australia, S. Africa etc. The principal exports are cotton textiles, silk fabrics and Rayon, raw silk, woollen goods, toys, electrical goods, machinery, etc. The principal imports are grains, raw cotton, sugar, rubber, coal, iron, petroleum, fertilizers, etc.

HOKKAIDO lies north of 'Old Japan', and is inhabited mainly by the aboriginal Ainu. The climate is severe in winter, the island being more exposed to the bitter winds from the heart of Asia. In summer, however, it is warm enough for *rice*; but *peas* and *beans* are the principal crops; some *oats*, *barley*, *maize*, *buckwheat*, *millet*, and *potatoes* are grown. About 25 per cent of the land is said to be suitable for cultivation. *Mining* and *fishing* are important; the mining is done mainly by the Japanese. The island, however, does not offer suitable facilities for Japanese emigration. *Forests* are also important, and *stock-raising* is, relatively speaking, more extensive than in old Japan.

KARAFUTO, farther north, is the southern half of the island of Sakhalin. The climate is even worse than that

Products of Hokkaido, and there can be no question of Japanese emigration there. Only about 0·7 p.c. of the land is suitable for cultivation. *Fishing* and *forestry* are important; and there is some *coal*; but the *oil* resources of the island are within the Russian boundary.

Climate & Products. **KOREA**, or Chosen, as the Japanese call it, is a mountainous peninsula to the west of Old Japan. The climate is, broadly speaking, like that of North China, and there are wide stretches of arable land. The principal products are *rice*, *beans*, *wheat*, *barley* and *oats*. The production of *cotton* has also increased, and *flax* has also been introduced. *Gold* and *coal* are also mined. **Seoul** is the capital, and **Fusan** the principal port. Other ports are Wiju, Chemulpho, Pingyang, and Wousan. The principal **exports** are *rice* (47 p.c.), *beans* (9 p.c.), *fish* (5 p.c.), *raw cotton* (3 p.c.), and *timber* (2·5 p.c.); about 92 per cent of the total export trade is with Japan, 7 p.c., with China, and only 1 p.c., with other countries. The principal imports are *cotton manufactures* (13 p.c.), *machinery* (2 p.c.), *grass cloth* (2 p.c.), *paper* (2 p.c.), *timber* (4 p.c.), *coal* (3 p.c.), *kerosene oil* (2 p.c.), and *sugar* (1·5 p.c.); about 66 per cent of the total imports come from Japan, 25 p.c., from China, 4 p.c., from the U.S.A., 2·5 p.c., from Great Britain, and the rest from other countries.

FORMOSA, or Taiwan, lies to the south-west of Japan. The Tropic of Cancer cuts the island into two halves, and the climate, in some respects, resembles that of Central China, and in other respects that of South China. It, too, was formerly a Chinese province, and the inhabitants are still mainly Chinese. But there are a number of primitive races in the east, which is a mountainous tract of land. Some Japanese have, however, settled in the island. The island is rich in minerals such as *coal*, *gold*, *copper*, *petroleum*, *sulphur*, *phosphorus* etc., and the mining is naturally in Japanese hands; there is also a large surplus of *rice* for export to Japan; *camphor* trees abound, and it is from here that Japan obtains the bulk of her output of camphor and camphor oil; such tropical crops as the *sugar-*

Products.

cane, which it is nearly impossible to grow in Japan, can be grown here; *jute* and *China grass* have also been introduced; and *Formosa tea* is famous for its delicate flavour. **Keelung** and **Takao** are the chief ports, now provided with good artificial harbours. The chief **exports** are *cereals* (20 p.c.), and *other foodstuffs* (43 p.c.), *chemicals* and *drugs* (6 p.c.), *minerals* (5 p.c.), and *yarn* (2 p.c.); about 83 per cent of the export business is with Japan, 8 p.c. with China, 3 p.c. with the U. S. A., 2 p.c. with Foreign Trade. Hong Kong, and 1·5 p.c. with the Netherlands East Indies. The chief imports are *oil-cake*, *wood*, *petroleum*, *opium*, and *manufactured goods*; nearly 68 p.c., of the total imports are from Japan, 16 p.c., from China, 3 p.c., from Indonesia, and about 2·5 p.c., from Great Britain.

The South Sea Islands of Japan.—Japan governed a large number of islands in the Pacific, which were formerly under Germany, in exercise of her mandatory powers. The chief products obtained from these islands are *copra* and *sugar-cane*, and some *phosphate*.

SOVIET ASIA

Soviet Asia forms the great land mass lying east of the Urals and the Caspian Sea and contains the entire Arctic Coast line of Asia from the Kara sea to the Behring Strait. It also stretches deep into the heart of the continent of Asia to the boundaries of Iran, Afganisthan and China and overlooks India. It is only a part of the economic and political unit known as the **Union of the Socialist Soviet Republics**. (Chapter IV).

QUESTIONS

1. Estimate and locate the mineral wealth of China.
2. What, in your opinion, are the causes which have made China backward in the matter of industrial development inspite of having mineral resources, cheap labour etc? Discuss fully.
3. Estimate and locate the mineral wealth of Japan.
4. Give an account of (a) the natural resources and (b) the climatic conditions of Japan and show how they have affected her development.

5. What are the principal industries of Japan? Where are they situated? State the sources of supply of raw materials.

6. Of late Japan is forging ahead in the matter of industrial development. How has this been possible for her and what are the present chief industries of Japan?

7. Give a geographical description of Java mentioning her principal exports.

8. State the importance of Indonesia in the world economy. To what extent is that region a competitor to India? Is there any possibility of increasing the trade between the two countries? If so, in what direction?

9. Describe briefly the development in the transport system in the Middle East.

10. Give a reasoned geographical account of the Philippines and the Malaya Peninsula.

PART—III

INDIA

CHAPTER I

PHYSICAL ENVIRONMENT AND THE PEOPLE

Introduction.—India is a triangle-shaped, peninsular country, situated in the centre of Southern Asia. The country is full of contrasts both in physical features and in climate and she is also a vast ethnological museum. The physical contrasts are fully reciprocated in the varied characteristics of India's vast population. Every provincial race resembles a distinct nation in India as do the various nationalities of a continent. The inhabitants of different provinces have different traditions, languages, manners and customs. The customs, religions, languages, culture, physical features and climatic conditions of India so sharply differ from those of her neighbours, her well-marked natural boundaries, both on land and sea frontiers, have so clearly isolated her from her surrounding regions, that she deserves to be treated as a separate geographic unit, a sub-continent within the Continent of Asia. But this vastness of area and the varied features of the region do not cut through the underlying unity. Even a casual glance at the physical map of India will convince us of the fact that "there is no part of the world better marked off by nature as a region by itself..... It is a region indeed full of contrasts in physical features and in climatebut the features that divide it as a whole from surrounding regions are too clear to be overlooked". The sharp regional differences do not obscure its oneness. India presents a picture of cultural unity in the midst of physical diversity.

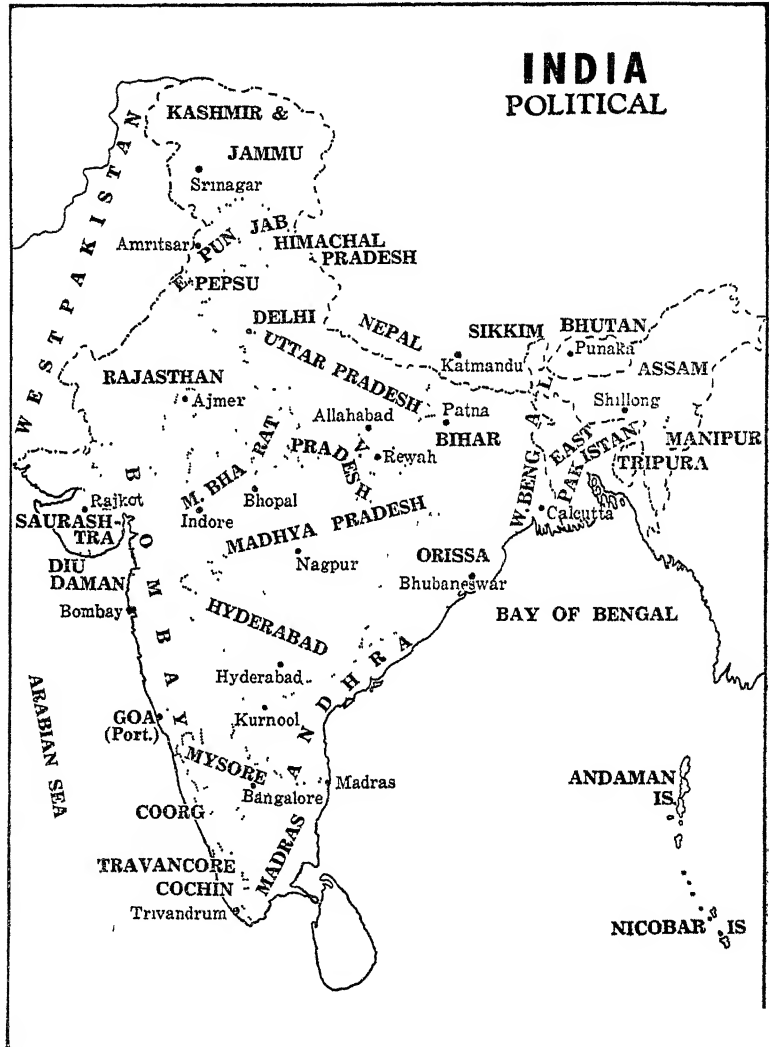
India—
a Sub-continent.

Unity in
the midst
of diversity.

Area and Population:—Indian Union comprises an area of 12,69,640 sq. miles, including Jammu and Kashmir and Andaman and Nicobar Islands, almost the same size as that of China, two-thirds that of Europe excluding Russia or about thirteen times that of Great Britain. India is the seventh largest country in the world. The length of the country from east to west is about 1700

Area and
Population.

miles, that from north to south is about 2000 miles. She has a land frontier of over 3000 miles and a coastline of about an equal length. India lies north of the equator



Political Map of India.

between the latitudes 8° and 37° north and longitudes $66^{\circ}20'$ to 97° east. The total population of the country,

according to the census of 1951, is 361 millions including Kashmir and tribal areas of Assam. The average density of population in India is 312 per sq. mile. This represents an increase of 12·5 per cent over the population of 1941. Out of the total population of India 17·3 per cent live in cities and towns and the remaining 82·7 per cent in villages.

The following table shows the statewise density of population in India :—

		Area in sq. miles	Population in thousands	Density of population per sq. mile	Rate of increase per cent on the basis of 1941
Part A States					
1.	Assam ..	85,012	90,44	106	19·1
2.	Bihar ..	70,330	40,226	571	10·1
3.	Bombay ..	111,434	35,956	323	23·2
4.	Madhya-Pradesh	130,272	21,248	163	8·2
5.	Madras ..	127,790	57,016	446	14·4
6.	Orissa ..	60,136	14,646	243	6·4
7.	Punjab ..	37,378	12,641	338	0·5
8.	Uttar-Pradesh	113,409	63,216	558	11·8
9.	West Bengal	30,775	24,810	806	13·6
Total ..		766,536	278,803	364	12·6
Part B States					
1.	Hyderabad ..	82,168	18,655	227	14·2
2.	Jammu-Kashmir	92,780	4,410	47	
3.	Madhya-Bharat	46,478	7,954	171	10·9
4.	Mysore ..	29,489	9,075	309	25·7
5.	Pepsu ..	10,078	3,494	346	2·7
6.	Rajasthan ..	130,207	15,291	117	14·9
7.	Saurashtra ..	21,451	4,137	193	16·2
8.	Travancore- Cochin ..	9,144	9,280	1,015	23·7
Total ..		421,795	72,296	206	15·8
Part C States					
1.	Ajmer ..	2,417	693	287	18·6
2.	Bhopal ..	6,878	836	121	7·3
3.	Bilaspur ..	453	126	278	14·5
4.	Coorg ..	1,586	229	144	35·5
5.	Delhi ..	578	1,744	3,017	90
6.	Himachal Pradesh	10,451	983	94	3·8
7.	Kutch ..	16,724	568	34	11·8
8.	Manipur ..	8,628	578	67	12·9
9.	Tripura ..	4,032	639	158	24·6
10.	Vindhya Pradesh	23,603	3,575	152	6·1
Total ..		75,350	9,971	132	18·6

Part D States	Area in sq. miles	Population in thousands	Density of population per sq mile	Rate of increase per cent on the basis of 1941
Andaman & Nicobar Islands & Sikkim	5,959	169	29	9
Grand Total ..	1,269,640	361,239		

Mountain
Rampart.

Environmental Setting.—India is the largest of the three peninsulas which occupy the southern part of the continent of Asia. It is a wedge of land projecting southwards from the main land mass of the Asiatic continent, separated from it by the most impassable mountain barriers in the world. There are the lofty Himalayas and Karakoram ranges guarding the northern frontiers : on the north-west are the Sulaiman and Khirthar mountains. Then there are the western deserts and the eastern mountain chains and valleys which offer only a few openings. Elsewhere she is bounded by the Indian Ocean, the Arabian sea and the Bay of Bengal.

Coastline

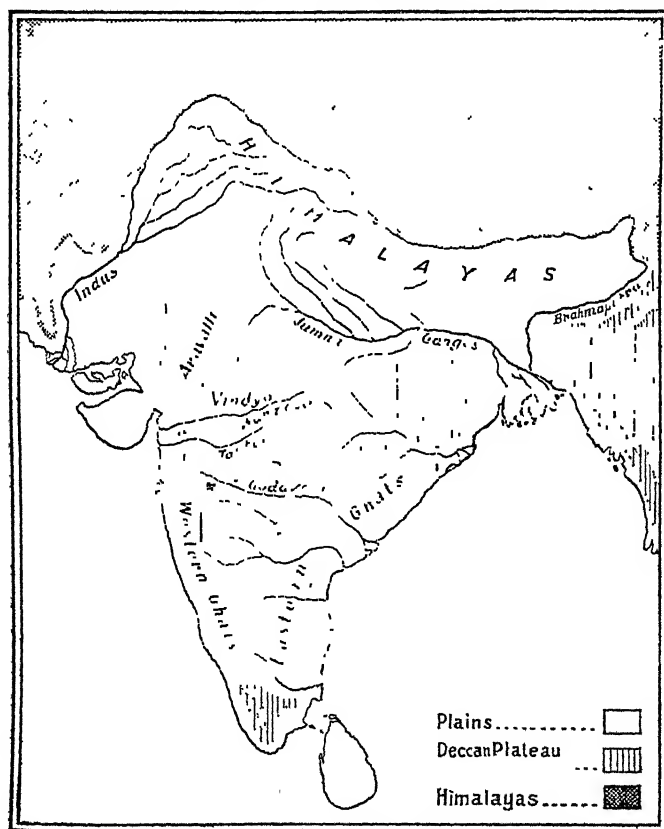
Coast-line.

Coastline.—India's coastline is over 3000 miles in length. India is relatively well-placed for purposes of international commerce. Her position at the centre of the Eastern Hemisphere and at the head of the Indian Ocean enables her to have convenient sea-routes for trade between the West and the Far East. But inspite of her favourable geographical position for commerce, India suffers from a great disadvantage in being deficient in good harbours. There are very few inlets which favour the construction of good natural harbours. The long coast-line of India is almost unbroken in proportion to its length. The west of the peninsula is rocky and narrow, and the sea near it is deep, while the east coast is less rocky, sloping down to the sea which is shallow near the coast. Due to the straight and unbroken character of the coast, there are only very few suitable harbours, namely, Bombay, Goa,

Cochin, Madras and Calcutta. Of late an artificial harbour has been constructed on the east coast at Vizagapatam. But the country has a large number of ports to carry on sea-borne trade and commerce. The long coast provides an opportunity for coastal shipping. Broad continental shelf and deep seas give scope for development of fishing industry. Seawinds have considerable modifying effect on the climate of the coastal regions.

Natural Regions

Natural Regions :—Broadly speaking, India presents three well-marked physical regions—(i) The Northern



Relief Map of India.

Mountains, (ii) The Indo-Gangetic Plain and (iii) The Deccan Peninsula.

Protective Wall.	The Northern Mountains may again be sub-divided into (i) The Western Himalayas, (ii) The Eastern Himalayas, (iii) The Eastern Hills and (iv) Ladakh or Tibetan Plateau Region. The great mountain wall of the Himalayas runs 1280 miles from east to west and covers about 150 to 200 miles from north to south and separates the plains of India from Central Asia and Tibet. Subsidiary ranges run southwards to the sea both in the north-west and the north-east. Apart from their political significance as an impregnable barrier, the Himalayas exercise a dominating influence on the economic condition of the country by their effects on rain, winds, temperature, moisture and vegetation. They intercept the monsoons and thus provide rain water for the plains. They also prevent the piercing cold wind of Central Asia from entering India. Mighty rivers which have made Indo-Gangetic plain "the granary of India", originate in the Himalayas. The Himalayan watersheds may be utilised for the generation of hydro-electricity. The Himalayan region upto a certain height abounds with animal and forest resources. The upper-heights have temperate trees and the lower slopes contain dense tropical forests and jungles. Agriculture is practised in the hill slopes and in the wetter and warmer valleys. Tea and rice are the important agricultural products. The beauty of the snow-clad peaks and the lure of the unknown attract tourists and mountaineers from all parts of the world.
Economic importance.	
Products.	

Western Himalayas	The western Himalayan region includes Karakoram, Ladakh and the Great and the Lesser Himalayan ranges. Here the climate is comparatively drier than the Eastern Himalayan region. The forests supply soft timber, turpentine and fruits such as peaches, plums, pears and apricots. Chirpine is the important tree. Sheep is reared on the hill-slopes and wool is the important economic product.
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The Eastern Himalayan region stretches from the western boundary of Nepal to the north-east of Assam.

Here the rainfall is heavy and the forests contain ever-green and deciduous trees. On the hill slopes tea, rice, and oranges are produced. Eastern
Himalayas.

The Eastern Hill region marks the boundary between India and Burma. These hills are the continuation of the Himalayas forming important ranges as Naga, Lushai, Patkoi and Chin and comprising the Khasi, Jaintia and Garo hills of Assam. This region gets the heaviest rainfall through the direct influence of south-west monsoon winds. Hill top is covered by dense evergreen forests. Oranges and pineapples are abundantly grown here. Tea is cultivated on the hill slopes. Petroleum and some amount of low grade coal is found in this region. Timber tea, petroleum and fruits are the important commercial products.

Ladakh is the north-eastern part of Kashmir. Sheep-rearing is the important occupation of the inhabitants. Wool and woollen goods are the important items of export. The area is supposed to be rich in minerals but proper exploitation of these minerals has not yet been done.

The Indo-Gangetic Plain lies between the Peninsula and the Himalayas and stretches almost without break from Beluchistan to the borders of Burma. The three great river systems water it, two of which, the Indus and the Brahmaputra, originate in the great Central Asian Plateau behind the Himalayas, while the third, the Ganges, collects most of the drainage of their southern slopes. The larger part of this immense plain, covering an area of about 300,000 sq. miles, is alluvial. "The aspect of the region varies from the arid, sunbaked plains of the Punjab to the reeking forests of Assam and the swamps of the Gangetic delta, but the general effect is that of flatness unbroken except where there is sudden drop from the upland plain to the lower level near the streams" Favourable climate and fertile soil have made this region the richest and the most populous part of India. The rivers of this region are perennial and lend themselves admirably for irrigation purposes. Agriculture is the The three
great river
systems.

Products.

most important occupation here. Wheat, barley, maize, rice, sugar-cane, jute, cotton, tea, oil-seeds, etc., are the important products. Important minerals like coal, oil, iron, mica, manganese occur here and the availability of minerals and agricultural products has given rise to many important industries.

Elevation.

The Deccan is a large table-land, triangular in shape, occupying a large part of Southern India. It is for the most part a region of wide valleys and gentle slopes with an average elevation of about 2000 ft. The junction of this triangle with the Indo-Gangetic plain in the north is marked by a confused range of mountains running west to east.

The
Western
and the
Eastern
Ghats

On either side of the plateau, there exist two mountain ranges known as the Western Ghats and the Eastern Ghats. There are two strips of coastal plain between the Ghats and the Seas, called the Kankan and the Malabar on the west and Coromandal on the east. The Western Ghats rise steeply from the narrow coastal plain and stand like a gigantic wall facing the Arabian Sea. At its eastern side the plateau descends to the Bay of Bengal in a series of irregular spurs and ridges known as the Eastern Ghats. The presence of the Ghats makes the inland region peculiarly liable to drought and famine. The coastal strips are composed of alluvial soil and get good rainfall, hence agriculturally they are the most important areas of the Deccan. Also, in the north-west there is a large area of deep, rich, moisture-retaining soil, known as the "black cotton soil". The chief peninsular rivers are the Narbada, the Tapti, the Mahanadi, the Godavari, the Kristna and the Cauvery. As the sloping of the plateau is towards the east most of the rivers flow into the Bay of Bengal ; only the Narbada and the Tapti flow west to the Gulf of Cambay in the Arabian Sea. The rivers being mostly rain-fed, dry up in the hot weather and none of them is navigable for any great distance.

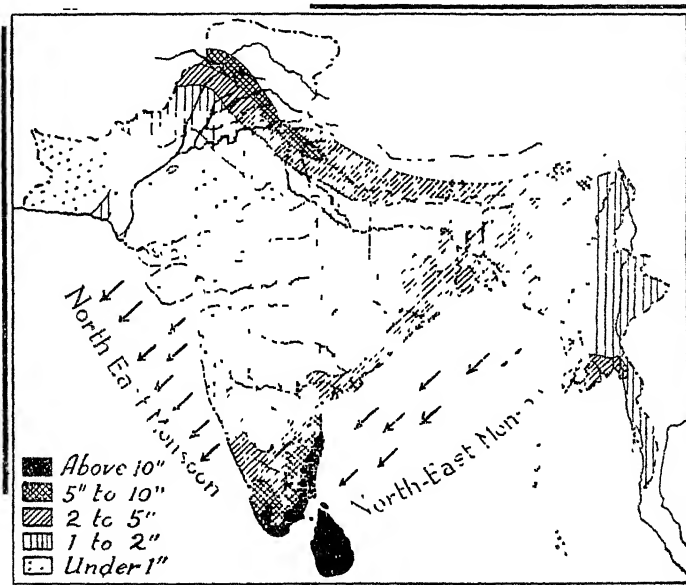
Rivers.

The chief agricultural products of this region are millets, rice, oil-seeds, cocoanut, pulses, cotton, tea, coffee,

spices and rubber. Evergreen forests cover the Western Ghats from Cape Comorin to Gujerat and valuable trees like teak, ebony, and sandalwood grow plentifully. The plateau is also rich in mineral resources. Gold, iron and mica are the most important minerals found here.

Climate

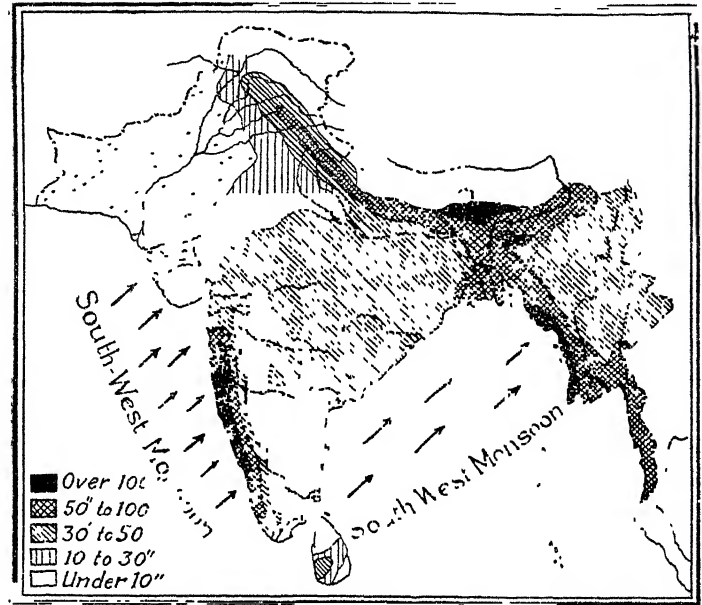
The Tropic of Cancer cuts through India from west to east, so that one half of the sub-continent lies in the



Winter Rain and Winds.

Temperate Zone, the other half is located in the Torrid Zone. Yet, India is commonly regarded as a tropical country. In summer the sun is vertical over a large part of the country which in consequence gets very hot; at this season the Punjab plains are among the hottest regions of the world. But this heat generates various low-pressure centres over the plains of the Punjab and thus draws in cooler winds from the sea. As a consequence, other parts of India are not as hot as they should be. The July average temperature.

for north-west India is considerably above 90°F ; in north-west Bihar and north Gujerat it is between 86°F and 90°F . Towards east and south temperatures are lower ; in West Bengal and Central India it is between 80°F and 85°F ; in Bombay and the adjoining tracts the temperature is between



Summer Rain and Winds.

70° and 80°F , or even lower. Madras, however, has higher temperature (80° — 85°F) as the winds there blow from the land. In winter, on the other hand, when the sun is considerably south of the Tropic of Cancer, it is cooler and cooler from south to north, the January average for the Punjab plains is between 40° and 60°F ; over the greater part of Central India it is between 60° and 70°F . In Bombay, Hyderabad, Mysore and the adjoining regions it is between 70° and 75°F . In Madras, however, the temperature rarely sinks below 75°F .

The Indian year is divided into three well-marked seasons according to rainfall and temperature :—(1) the

winter season from October to February, (2) the summer season from March to June and (3) the rainy season beginning, practically, from the middle of June to the end of September. From the economic point of view the rainy season is the most important of the seasons of India.

Monsoons

Climatically India belongs to the great monsoon region. Monsoon comes from an Arabic word "Mausim", meaning season, and in India Monsoon means the rainy season. The rainfall in India is mainly influenced by the monsoons although the direction of the winds as well as the distribution of rainfall is governed by the topography of the country. India has two distinct periods of rainfall, one just after summer and the other during the winter. The former is caused by the south-west monsoon and the latter by the north-east monsoon. The south-west monsoon which is the continuation of the south-east Trade Wind, blows from sea to land. It carries with it particles of water and gives rain to India from May to September. It is responsible for about 90 per cent of the country's total rainfall and reaches the country in two currents—the Arabian Sea current and the Bay of Bengal current. The Bengal current freely traverses the east coast, Burma, Bengal and Assam and causes ample rainfall in these areas. The wind is then deflected by the Himalayas up the Ganges Valley as a south-easterly wind. As it travels westward the rainfall diminishes in quantity and becomes uncertain. The Arabian Sea current showers torrential rains on the coastal strip of the Western Ghats but fails to bring an adequate supply to the central part of the peninsula. It gives some rains to the Central India.

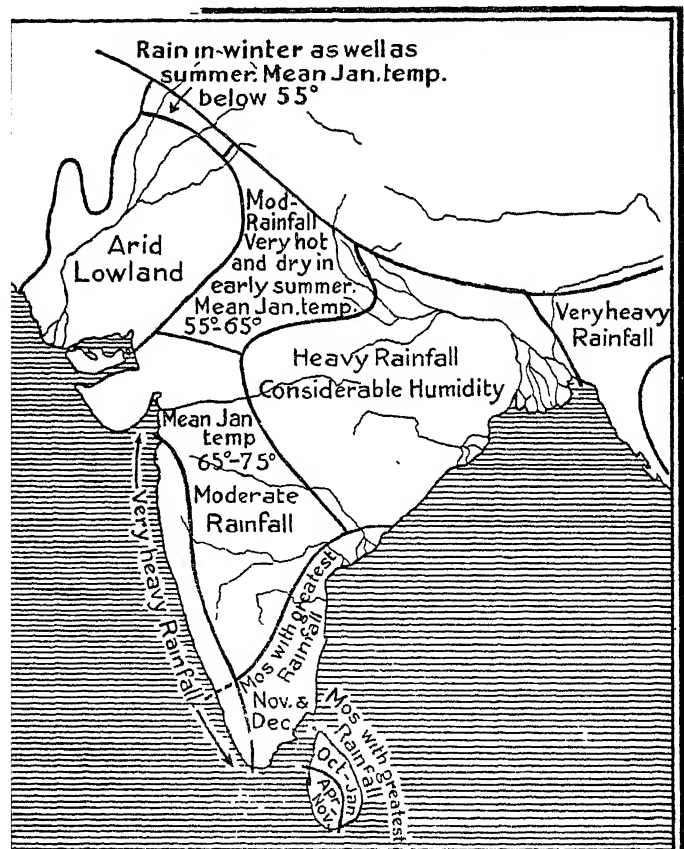
The north-east monsoon blowing from land to sea gives very little rainfall to India. It starts in October and lasts till the end of May. Madras receives some rainfall in the eastern coast by the north-east monsoon.

The normal rainfall in India widely varies from an average of about 500 at Cherrapunji in Assam to less than

Rainfall
divisions

5 inches in Rajasthan, the average for the country being 42 inches. Thus, we find that rainfall is not constant all over India. This mal-distribution of rainfall has given rise to division of India into climatic regions, based on rainfall.

(1) Regions with more than 80 inches of rainfall. West Bengal, Assam, western coast of South India and the foot-hills of the Himalayas are included in this division which may also be termed as "the areas of certain and heavy rainfall". Evergreen forests form the typical vegetation of the region. Rice, tea and jute are the important crops.



The Climatic Regions of India.

(2) Regions with rainfall between 40 and 80 inches. This division includes West Bengal, Bihar, Orissa, eastern part of M.P. and U.P. and the eastern coast of Madras, and may be termed as "the areas of moderate rainfall." Rice is the main food crop here ; maize, sugar-cane, oil-seeds, wheat, jute and tobacco are the important agricultural products.

(3) Regions with rainfall between 20 and 40 inches include Carnatic region, southern and north-western Deccan, Upper Ganges plain and Central Indian foreland. This region may be termed as "the area of precarious rainfall". The natural vegetation is generally scrubland. Typical dry zone crops, such as millets, oats, etc., can only be grown with the help of irrigation. This region is frequently visited by famines and large-scale irrigation is indispensable.

(4) Regions with rainfall less than 20 inches comprise Southern Punjab plains and Rajputana. This arid region may be termed as "the region of drought" and cultivation here is impossible without irrigation with the help of which wheat, barley and cotton may be raised.

Economic effects of the Monsoons :—The Monsoons have a far-reaching effect on the economic prosperity of India. India is mainly an agricultural country and agricultural operations here ultimately depend on the nature and amount of rainfall. A little change in the direction of the wet winds may bring about a famine and famines are not uncommon in India. "The monsoons being naturally fitful, India is heir to great productive freaks." These winds are of vital importance to the teeming millions of India and mean prosperity when they arrive in time and dearth and famine when they are delayed. If there is insufficient rainfall or excess of it, or if the monsoons appear earlier than is usual or disappear earlier, there is every possibility of a serious failure of crops which means famine, deterioration in the financial condition of the cultivators, consequent adversity to the landlords and money

Economic
effects
of the
monsoons.

lenders, reduction in the amount of revenue collected, dearth of raw materials for the industries and decrease in the volume of exports of agricultural products and increase in the import of food grains—increase in the cost of manufactures and a fall in the purchasing power of the poor and the middle-class people. Balance of foreign trade is adversely affected, customs duties fall and exchange is weakened. Thus it will be seen that the monsoons have far-reaching effects on the economic condition of the country.

The Distribution of Population

Irregular
distribution
of popu-
lation

The monsoons have also affected the distribution of population in different parts of India. The distribution of population is one of the most important productive forces and density of population influences exploitation of natural resources of a country and its consequent economic advancement.

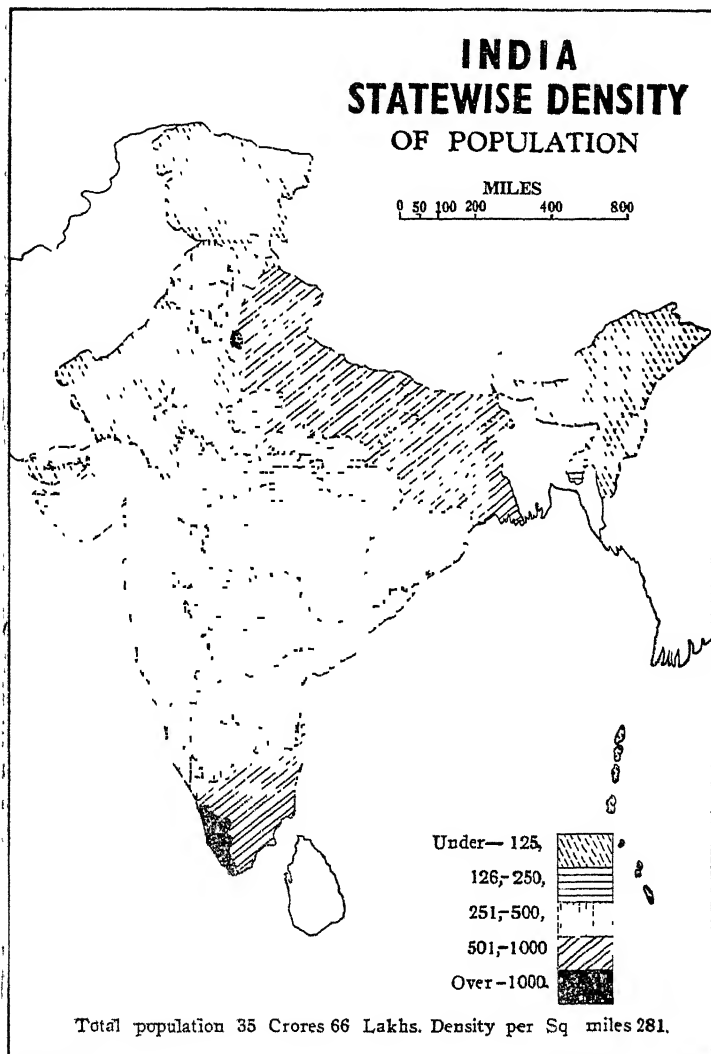
India is one of the most densely-populated parts of the world containing as much as one sixth of the world's total population. The most striking feature of India's population is its uneven distribution in the different states, ranging from 9 persons per square mile in the Andaman and Nicobar Islands to 1015 in Travancore-Cochin.

Causes.

The distribution of population is influenced by a number of geographical and economic factors, such as climate, configuration of land, fertility of the soil, abundance of mineral resources, facilities of communication, economic progress, etc.

India is primarily an agricultural country, and as such, it is reasonable to expect that the distribution of population should be governed more by the facilities of agriculture than by anything else. Thus in India, areas favourable for agriculture are also those of the highest density of population. The most favourable factor for agriculture in India is rainfall. A comparison of the rainfall map of the country with the population map will at once reveal the fact that the areas of good rainfall are also, generally, the areas of the highest density of population.

Configuration of land also directly affects agriculture. Plains are generally favourable for settlement and agriculture while mountains repel both. In India population is the



thickest in the Indo-Gangetic plain and the coastal tracts, while the mountain regions of the north and the plateau

areas of the south generally have a low density of population.

Another factor directly affecting agriculture is the natural fertility of the soil. Areas with fertile soil support a larger population than those with poor soil.

The degree of economic progress attained by an area is also one of the determinant factors of its density of population. Eastern Punjab, the Upper Ganges basin, the Lower Ganges basin and the coastal strips of peninsular India are agriculturally the most developed areas and are also the most densely populated parts of India.

Population is also dense in regions rich in mineral resources because of the potentialities of industrial development of these regions. West Bengal, Bihar and Uttar Pradesh present striking examples in this respect.

In short, "the distribution of population illustrates extra-ordinarily well the influence of geographical factors. The provinces of West Bengal, Bihar, United Provinces and Eastern Punjab which comprise the basins of the three great rivers of India are the most densely populated parts and contain over half the population of India.

The flatness of the ground, the great fertility of the soil, the favourable rainfall and temperature condition and the richness and variety of natural resources have all combined together to make the basins of the Indus, the Ganges and the Brahmaputra to be the most densely populated parts of India. The great rivers supply manure and moisture, and highways of commerce for all the wealth of the plain."

Soils

The nature of soil is an important determinant factor in the successful development of agriculture. Different types of soil found in different parts of India have been influenced in their formation by the diversity in rainfall and geological conditions. Some of them are helpful for agriculture and others are poor and require enrichment by artificial measures.

The close correspondence of the principal physical features of India with the geological structure of the land is obvious. The mountain rampart of the north consists mainly of folded sedimentary rocks of the Alpine age. The great plain of Hindoostan is composed entirely of alluvium, and so are also most of the coastal plains. The plateau of peninsular India, however, consists mainly of pre-Cambrian crystalline rocks resistant to later Alpine folding. Nearly the whole of the north-west of the plateau is covered by thick sheets of lava, and the Deccan lava region is one of the most extensive lava regions of the world.

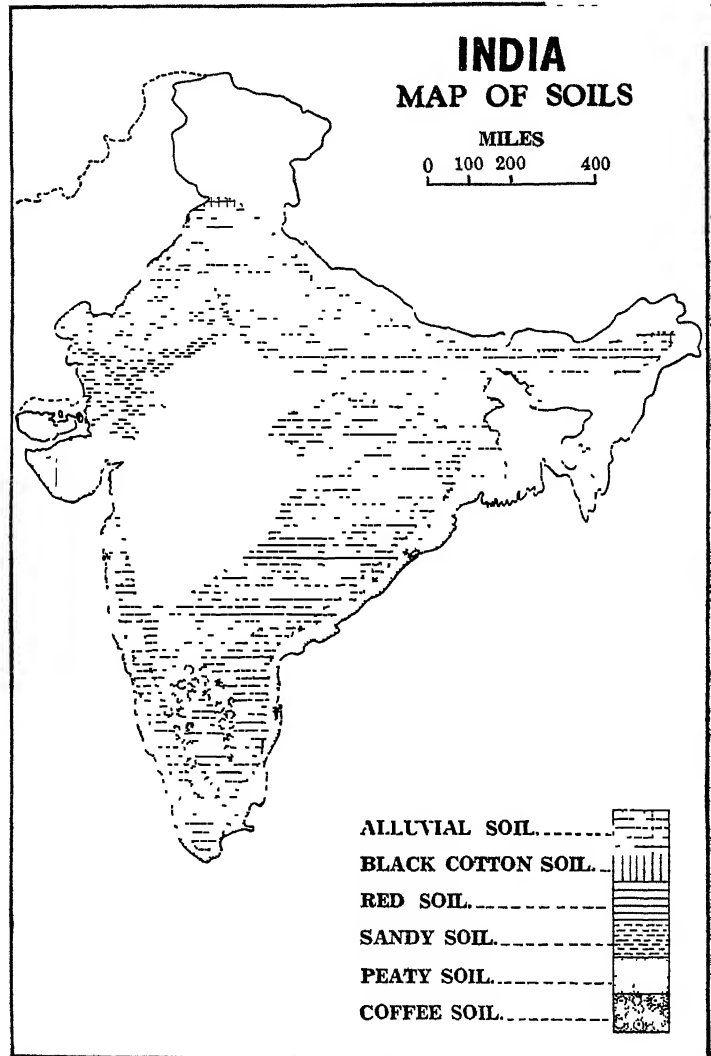
Soils in
India

India has a wide variety of soils, but four main types can nevertheless be recognised among them. One consists of the alluvial soils of the Indo-Gangetic plain. These, generally speaking, are the richest of all. The eastern and the western coastal strips of the Deccan have also this type of soil, very rich chemically: these soils have sufficient moisture-retaining capacity—intensive cultivation has developed in this area which comprises States of East Punjab, Uttar Pradesh, Bihar, West Bengal and Assam and the deltas of the Godavari, the Mahanadi, the Kistna and the Cauvery. Rice, jute, sugarcane and tobacco are the principal crops of this area.

Another type is the Black Cotton or regur soils which are widely distributed throughout the northern and western portions of the Deccan. These soils are very fertile and well-suited to cotton cultivation. This type of soil is mainly found in the valleys of the Narmada, the Tapi, the Kistna and the Godavari and in Madhya Pradesh, Kathiwar and in the western portion of Central India. It is rich in iron, calcium, aluminium and magnesium, but deficient in important ingredients like nitrogen and phosphorus. It is dark in colour and is compact, tenacious and highly retentive. Wheat, millets, cotton, linseed and gram are the principal products of this soil.

A third consists of the red-soils overlying the rocks of the Archean system in the south and south-east, mainly in Madras, Mysore, south-east Bombay, Hyderabad, Madhya

Pradesh, Chotanagpur and Orissa, Santal Parganas, the Birbhum district of West Bengal, some parts of U.P., Madhya Bharat and eastern Rajputana. This soil is not



very rich in chemical properties and deficient in nitrogen, phosphoric acid and humus.

The fourth type is the laterite soils which are generally not very productive. These are found in Madhya Bharat, Assam and in the coastal areas of the Deccan. It is rich in iron and alluminium and is suitable for tea-plantation because of its acidity.

In addition to these four principal types, some more distinctive soil regions are found in India. Among them the sandy soil of the desert areas of Rajputana, mountain soils of the hilly tracts of northern India and Peaty soil of Travancore-Cochin and the Deltaic areas of West Bengal deserve mention in this connection.

Soil Erosion

Successful agriculture is dependent, among others, upon the fertility of the soil. In India this has assumed greater importance in view of the fact that here agriculture has been carried on in the stereo-typed way and hardly any steps are taken for conservation of the soil which has become menacingly eroded through the agencies of water, wind and waves, specially through water due to flood or heavy rainfall. The soil cannot be washed away by flood or heavy rainfall if there are sufficient trees on the land or if the soil is covered by grass or other green vegetation. The indiscriminate cutting down of trees and removal of grass or vegetation on account of uncontrolled grazing account for the erosion of soil. Increasing pressure of population on land leading to large-scale deforestation and cultivation on the slopes of hills have resulted in soil erosion. Here soil erosion is an old problem of terrific proportion calling for immediate attention. Indian soils are generally poor and their deficiency should be made good by the application of nitrogenous and phosphoric fertilisers. To control sheet of erosion of soils, intensive efforts at afforestation should be made. The trees protect and conserve the soil. Their roots and the grasses check the flow of rain or flood water. They hold together the soil particles tightly and thus prevent soil erosion. Again, the practice of uncontrolled grazing should be checked.

The Planning Commission have recommended a number of steps for organising appropriate soil conservation measures. The government have established a research station at Jodhpur to study the problem of checking the eastward advance of the Rajputana desert. Already good results have been obtained by the adoption of the policy of creation of vegetation belts. It may be noted that our popular government is quite alive to the problem of soil erosion and are taking other necessary measures in this connection.

QUESTIONS

1. Describe the importance of studying economic geography of Indian Union.
2. Discuss the effects of political changes on the economic life of its people. In your answer refer to the recent trends in economic spheres in India and Pakistan.
3. Give an account of the distribution of rainfall in India, and show its relation with the natural vegetation of the sub-continent
4. What are the monsoons? Describe briefly their effect on the economic conditions of India
5. Account for the variety in the distribution of rainfall in India, and show its effects on the chief products.
6. Divide India into natural regions. Describe the climate, products and industries in each of them
7. Give an account of the physical environment of India and explain how far it has influenced the industrial and commercial activities of the country.
8. Describe the economic importance and give a geographical account of the Ganges Valley.
9. Give an account of the different types of soil found in Indian Union and their effect on Indian agriculture.
10. What combination of causes accounts for the concentration of population in the Ganges Valley?
11. Analyse the factors which determine the irregular distribution of population in India.
12. What factors are responsible for the remarkable concentration of population at certain places in India?
13. Give an explanatory account of the distribution of population of India with special reference to areas of high density.
14. Show how population varies in different parts of India and analyse the causes of such variation.
15. "Probably there is no other single group of weather phenomena which is so far-reaching in its effects as the Indian monsoon." Explain.

16. To what extent, in your opinion, is the commercial backwardness of India to be ascribed to geographical causes? Give reasons.

17. Compare the north-east and north-west of India proper in respect of (a) physical features, (b) means of communication, (c) climate, (d) agricultural products and (e) conditions affecting production.

18. Give an account of the distribution of rainfall in India. Indicate the relation between rainfall and crop production.

19. Give an account of the distribution of rainfall in India, and indicate the influence of rainfall on the agricultural and forest products of the country.

20. Draw a large sketch-map of India indicating and naming the main climatic regions. Choose two of these regions and show how the products are related to physical and climatic factors.

21. Discuss the effect of climate on the distribution of agriculture and large-scale industries in India.

22. Divide India into rainfall regions and show the relationship between the rainfall distribution and the main agricultural crops.

CHAPTER II

Agriculture

Agriculture is the chief occupation of the people of India. Here more than 70% of the population depend directly or indirectly on agriculture for their subsistence and agriculture accounts for nearly 48 per cent of the national income. Fertility of the soil, ample rainfall and facility of irrigation due to the existence of a net work of rivers and canals have made India pre-eminently an agricultural country.

Position
of agri-
culture
in India.

Agricultural products provide all the types of food-grains consumed within the country. India is an exporter of some commercial crops. The total area sown annually is 268 million acres of which only 36 million acres or 13 per cent are sown more than once. The existence of about 12 million acres of cultivable land and 59 million acres of

current fallows points to the scope of more extensive and intensive cultivation.

Classification of land area

Classification	Area (ooo acres)	(including irrigated area of 47,861,000 acres)
Cultivable	327,794	
Fallow land	59,365	
Land sown	268,429	
Land under forests ..	93,385	
Land not available for cultivation	99,572	
Other uncultivated land excluding fallow land ..	102,665	

Although agriculture is the single largest industry in India, it is in a hopelessly backward and stagnant condition. The outturn per acre of nearly all the crops in India is exceedingly low. This is generally attributed to (a) soil exhaustion, (b) the export of natural manure in the form of oilseeds, (c) uneconomical farming arising out of sub-division and fragmentation of lands due to current laws of inheritance, (d) illiteracy and poverty of the cultivators.

In order to ensure all-round economic progress of India more attention should be given to the improvement of Indian agriculture. Between 1891 and 1941 India's population increased from 221 to 389 millions. Some improvements in agriculture have no doubt been effected during the last fifty years but the increase in food production is not keeping pace with the growth of population. India gradually became a substantial importer of food-stuffs instead of an exporter. The last World War (1939-45) completely exposed the weakness of India's food position. Perhaps never before in the history of India, such an acute shortage of food-stuffs has occurred as was experienced immediately after the War. The famine in Bengal in 1943 resulted in the loss of 15,00,000 lives. The causes leading to this over-all shortage of food, more acutely in the post-war period, may be traced to (a) a rapid rise in population, (b) progressive exhaustion of soil due to continued use, (c) increased demand for foodstuffs by foreigners present in India during the War, (d) wastage of food crops and

destruction of arable lands by the bombing, adoption of scorched-earth policy, etc., (e) serious failure of crop due to vagaries of nature, (f) inadequate supply of agricultural tools and fertilisers, and to (g) shortage of agricultural labour due to more lucrative occupations provided by war. Some of the causes enumerated above are, no doubt, of purely temporary character owing their origin to the war, but this gives no room for complacency and the fact remains that India is not self-sufficient as regards food-supply. The production of cereals in the Indian Union is just sufficient for six-sevenths of her present population. The position has been further aggravated by the partition of the country whereby India has been deprived of surplus wheat from Sind and West Punjab.

The problem of food crisis has to be solved permanently and satisfactorily, if the country is to be placed on a sound footing so far as its food front is concerned. The measures that have already been adopted or have been recommended for adoption are (i) extension of cultivation to waste and fallow lands, (ii) intensive cultivation and introduction of crop rotation, (iii) extension of irrigation facilities, (iv) limitation from time to time of the acreage under cash or non-food crop like jute or cotton with a view to maximising the production of food crops. Also the qualitative aspect of the food problem should not be ignored. It should be remembered that the nutritive value of the diet of an average Indian is far from satisfactory. Efforts should, therefore, be taken to effect substantial improvements in the qualitative and quantitative supply of food.

Improvements
needed for
solving
food
problem.

If Indians want to increase their food-supply they must improve the standard of cultivation and crop-yield. The present backwardness in production of agricultural crops is due, to no less extent, to the caprices of monsoon rains.

Irrigation

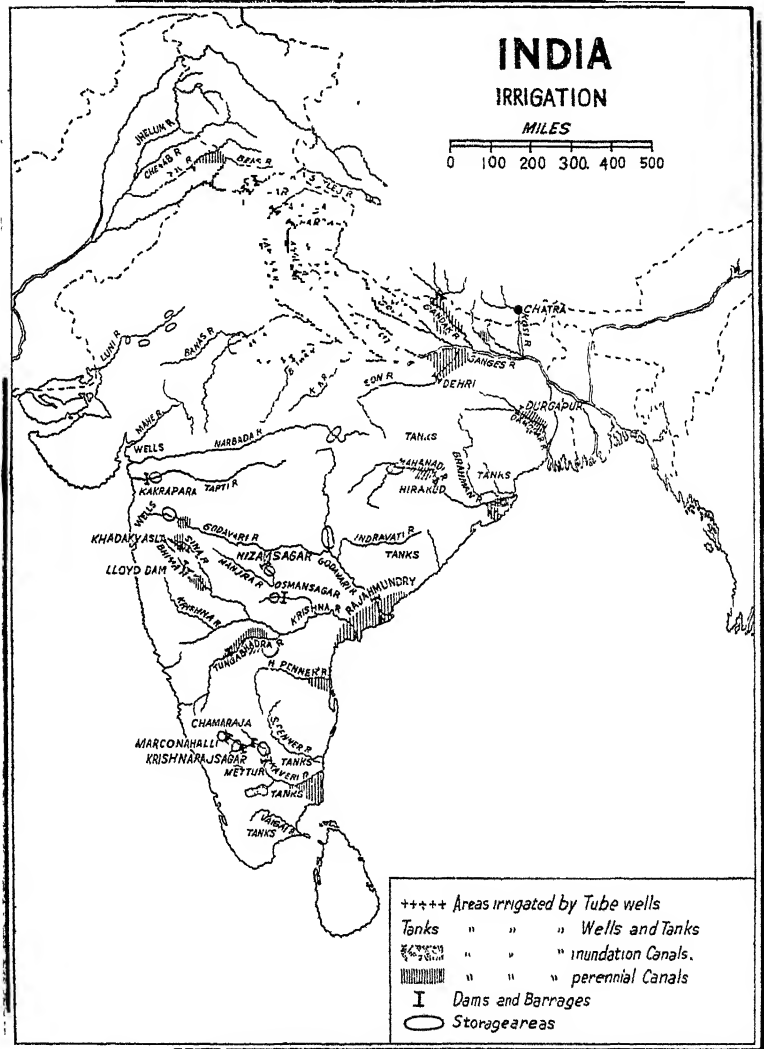
We have already seen that rainfall in India is uncertain and ill-distributed. Not only are there, from year to year,

the irrigated area of India is well-irrigated. There are some places where the soil is apparently dry but contains water underneath. In those places it is profitable for the cultivators to bring up the water to the surface. Some shallow wells are dug to obtain the sub-soil water and some deep wells to reach the greater depth for permanent supply Wells. of water. Water is raised from wells by manual labour, bullocks or water-lifts, by lever method or inclined plain method, or by Persian wheels. Recently electric tube wells have been introduced in Bihar and Uttar Pradesh. Well-irrigation is mainly practised in the plains of Northern India. Large tracts of the Punjab(I), the U.P., Bihar, Madras and Rajputana are irrigated by this process. The digging of wells is not an expensive affair ; hence they are mostly private works.

A tank is an artificial storage to collect rain water for irrigation when necessary. Large reservoirs, in the nature of artificial lakes by closing up natural valleys with huge dams, are constructed in which the rain water is stored. These are, however, liable to be dried up in the hot season. This system is prevalent in Madras, Mysore and Hyderabad. In Madras alone there are about 40,000 tanks serving between 3 million to 3½ million acres of land. Tanks

But the most important means of irrigation are the canals. The irrigation canals of India are of two distinct types, namely, those that are fed by rivers and those that derive water from artificial storage works, where the rivers dry up for a part of the year, as it is largely in the Deccan, and it becomes necessary to store up water across valleys by means of dams in the dry season and these are released through canals to irrigate the land. These are called Storage Canals. River canals are again of two types : (i) the Inundation Canals and (ii) the Perennial Canals. Perennial canals have water all the year round as they draw from rivers having permanent flow of water and they are provided with head-works enabling water to be drawn from the river irrespective of its natural level. An inundation canal starts from the bank of a river so that when in the flood season the river over- Canals.

flows water passes through the canal, but, otherwise, it can have no supply of water. Most of the canals, at present, are perennial and many inundation canals are being converted



into perennial ones. By perennial irrigation, agricultural production in the uncertain zone of rainfall has been

enormously increased, for, unlike the inundation method, it allows full advantage to be taken of in the hot season and so permits cultivation all the year round.

The total area irrigated in India is about 48 million acres or about 20 per cent of the total cropped area of the country. The Punjab(I) and the Uttar Pradesh have the largest areas of irrigated tracts. Irrigation has turned deserts and semi-deserts into fertile regions in these two states.

In Punjab(I) most of the area receives rain less than 20 inches. Thus semi-desert condition prevails there. But the conditions in the East Punjab are very helpful for the development of irrigation system. Irrigation has played the most important part in the agricultural economy of the state. The principal canals of the state are :—

(a) The Upper Bari Doab Canal serves the Doab between the rivers Ravi and Beas drawing water from the Ravi. The system serves the districts of Gurdaspur and Amritsar.

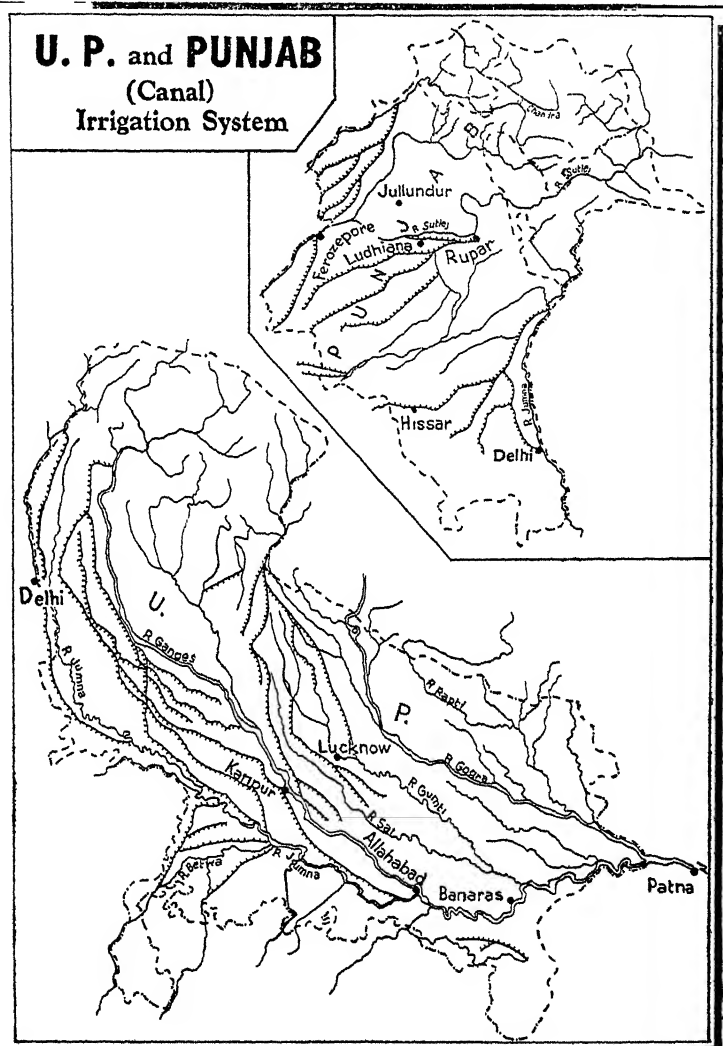
(b) The Western Jumna Canal draws its water from the Jumna river and irrigates the districts of Rohtak and Punjab (I). Hissar and the States of Patiala and Jhind, covering an area of about 890,000 acres. This canal is supplemented by the Bikaner Canal.

(c) The Sirhind Canal gets supply of water from the Sutlej at Rupar above its junction with the Beas and irrigates about 2 million acres of land in the districts of Ludhiana, Ferozepur, Hissar and Nabha.

The prosperity of the Uttar Pradesh is largely due to the great irrigation works. About 30 per cent of the sown area is under irrigation. The principal canals of the State are :—

(a) The Upper Ganges Canal draws its water from the Ganges near Hardwar and irrigates 100,000 acres of land in the Doab between the Jumna and the Ganges.

(b) The Lower Ganges Canal gets the supply of its water from the Ganges at Narora in the district of Buland-



shahr. It irrigates about 800,000 acres of land and is more than 3000 miles in length.

(c) The Agra Canal takes its water from the Jumna at Okhla near Delhi and irrigates about 400,000 acres of land. ^{Uttar Pradesh.}

(d) The Sarda Canal is the largest and the most productive canal of the state. Its headworks are situated at Banbassa on the border of Nepal. It draws water from the Sarda river. The length of the canal is over 5500 miles including its distributories and it irrigates Rohilkhand and the western part of Oudh.

(e) The Eastern Jumna Canal takes off from the Jumna near Faizabad and serves the north-eastern part of the state.

(f) Betwa Canal takes its water at the junction of the rivers Chambal and the Jumna.

In Madras about 8 million acres of land are irrigated of which nearly 4 million acres are under canal irrigation. Canals take their water from the Godavari, Kistna and Cauvery. The Periyar Canal system is one of the best examples of irrigation that exist in Southern India. The system uses the waters of the Periyar by means of a dam and diverting the river to the eastern part of the hills by tunnel.

The Mettur Irrigation system on the Cauvery river is the biggest in the Union and irrigates about 1 million acres of land. The other important canals in the Deccan are the Cuddapah, the Kistna, Delta, the Pravara and the Nira Right Bank.

In West Bengal and Assam canals are used mainly for draining the low-lying areas and for navigation as these are areas of certain and heavy rainfall. The Damodar Project, when completed, is expected to irrigate an extensive area of West Bengal. In Bombay canals are of minor importance.

The Canals of West Bengal are :—

(a) Midnapore High Level Canal, Hizli Canal and Orissa Coast Canal. All are in the districts of Midnapur.

(b) The Subhankari Dara Canal is in the district of Bankura.

(c) The Damodar Canal, the Eden Canal and the Behula Khal are in the district of Burdwan.

(d) The Dankuni Khal, Amodar Khal and Terajuly Khal are in the district of Hooghly.

It may be noted in this connection that the importance of irrigation in the economy of India was not lost sight of by the framers of the First Five Year Plan. They, therefore, made provisions for the expenditure of Rs. 266 crores on the various multi-purpose and power projects and Rs. 168 crores on the construction of other irrigation works. It has been estimated that when these projects are completed and fully developed, they will irrigate an additional area of 16·9 million acres of land.

The progress that has so far been achieved in the sphere of irrigation is quite satisfactory. More than 2·8 million acres have been brought under irrigation. The programme of irrigation in the Five Year Plan is a part of the long-term objective, namely, doubling the area under irrigation in a period of 15 or 20 years.

Agricultural Products

Food and
non-food
crops.

The net area under cultivation in India is over 268 million acres of which 78 per cent is devoted to food crops and 22 per cent to non-food crops. Rice, wheat, barley, millets, gram, sugar-cane, and maize are the principal food crops. The main non-food crops are cotton, jute, oil-seeds, tea, coffee, tobacco, rubber and hemp. Northern India has more land under plough than Southern India because of the greater proportion of plain level land and favourable climatic conditions.

Area under,
and yield of
principal
crops.

India normally has two harvests—the Kharif harvest in October and November for crops sown in the early weeks of monsoon and the Rabi harvest in January or February for crops sown at the end of monsoon. These harvests often alternate on the same piece of land, double-cropping upsets this rotation. The principal Kharif crops

are wheat, rice, millets, maize and cotton ; while the principal rabi crops are wheat, barley, gram and oil-seeds.

Area under, and Yield of Principal Crops 1952-53

Food Grains		Area (in 1000 acres)	Yield (in 1000 tons)	Non-food Grains	Area (in 1000 acres)	Yield (in 1000 tons)
Rice	..	74,674	23,424	Jute	1,834	4,695 (000 bales of 400 lbs. each)
Wheat	..	24,235	5,768	Cotton	15,678	3,050 (in 000 bales).
Jowar	..	41,945	6,038	Ground nut	11,862	2,894
Bajra	..	25,282	2,922	Oil- seeds	16,159	1,754
Maize	..	8,796	2,607	Tea		623 (m. lbs.)
Sugar-cane		4,927	5,895	Coffee		21,096 (tons)
Grams	..	16,719	3,657	Rubber	173	44 (m. lbs.)
				Tobacco	768	211

Due to wide variations in the soil, climate and topography of different parts of the country four types of agriculture are found to be practised in India.

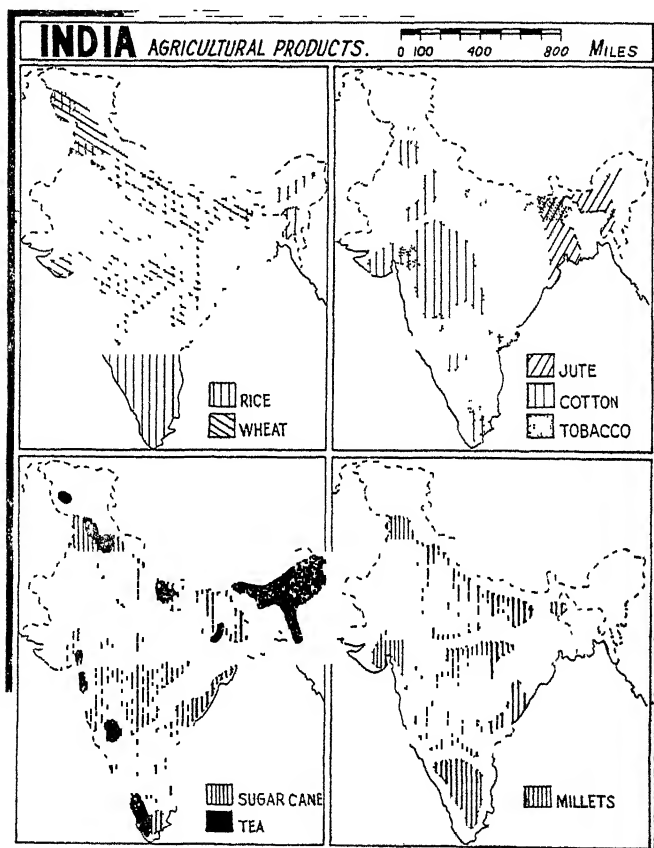
(1) Hill cultivation is practised in the level lands at the foot of the Himalayas in northern U.P., E. Punjab, Kashmir and in the mountainous districts of Assam.

(2) Wet agriculture is practised in areas with very heavy rainfall. Rice, jute, tea and sugar-cane are the principal crops grown under this system. The system is in vogue in the Central Sub-Himalayan regions, in some parts of West Bengal and in the Malabar Coast. Multiple Cropping is the characteristic feature of this system.

(3) Irrigation agriculture is characteristic of regions with rainfall between 20 and 40 inches. This system is practised in the Upper Gangetic Valley, East Punjab and Northern Madras. Cotton, wheat, millets, maize and sugar-cane are the principal crops that are grown with the aid of irrigation.

(4) Dry agriculture is characteristic of desert and semi-desert areas with less than 20 inches rainfall. Millets and pulses are the principal crops grown in these areas.

The States of Bihar, Bombay, East Punjab, the M.P., Madras, Orissa, Uttar Pradesh and West Bengal are agriculturally more advanced than the other States where



cultivation of land is difficult due to other reasons. The unhealthy climate, dearth of plain level lands and the presence of dense forests have retarded the progress of agriculture in Assam, while the desert and semi-desert conditions of Rajasthan have rendered cultivation of land extremely difficult there. Similarly, the poor-quality of the soil in Eastern Bombay and some parts of Madhya-Pradesh and the prevalence of malaria in Orissa have caused these regions to remain agriculturally backward.

Food Crops

Rice—It is the most important food-grain of India. It occupies as much as about 30 per cent of India's sown area. India is the second largest rice-producing country in the world.

It is wholly a "wet region crop", grown mainly on flat, alluvial soil where rainfall is abundant. Where, however, the annual precipitation is below 40" it can scarcely be grown except on irrigated land. Rice grows well in high temperature and heavy rainfall, and in areas which remain under water for sometime at certain stage of its growth. Hence the deltaic regions, coastal districts or the low-lying areas are the important rice-producing areas. It also grows in hill tracts where rainfall is heavy and summer is warm. There lands are levelled off and bunds are constructed for retaining water. Where conditions are favourable, it generally takes 120 to 150 days to grow. In India, rice is grown in all seasons. There are three principal varieties of rice grown in India, namely, (1) Autumn crop or the Aus, (2) Winter crop or the Aman and (3) Summer crop or the Bora according as the crop is harvested in autumn, winter or summer. The winter crop ripening in December and January forms about 75 per cent of the total annual produce. Two crops are generally obtained in one year from the same field, but in canal-irrigated districts of Bihar and Madras as many as three crops are raised on the same field annually.

Geographical conditions of production.

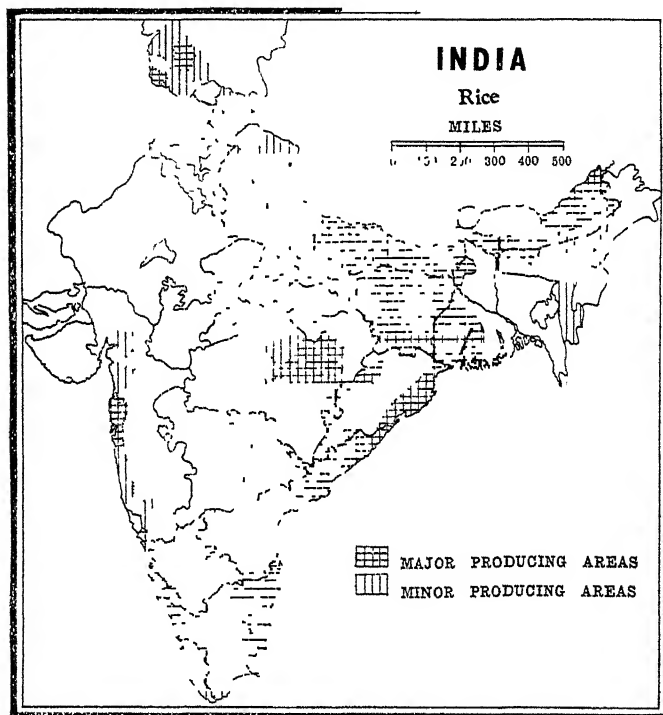
Rice is a typical monsoon plant. The production of rice is greatly influenced by the S.W. monsoon and its failure has a very damaging effect on the crops.

It is chiefly grown in West Bengal, Bihar, Orissa, Assam, Madras, Uttar Pradesh and Madhya Pradesh. Bombay and East Punjab are also fairly important producers. The chief rice-growing province is W. Bengal from the point of view of both acreage and yield. In this state rice is grown in all the districts. The area under rice in 1952-53 was 74 million acres and the yield was 23 million tons.

Area under, and yield of rice in India.

Area and Yield of Rice in India 1950-51

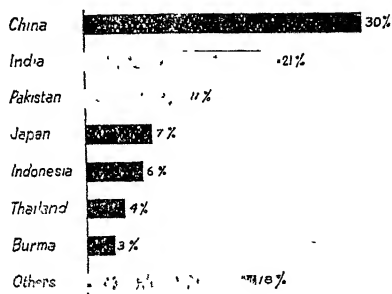
State	Area (in lakh acres)	Yield (in lakh tons)
West Bengal ..	98	39
Madras ..	101	40
Bihar ..	145	25
Madhya Pradesh ..	89	15
Uttar Pradesh ..	93	20
Assam ..	37	13
Bombay ..	30	10
Orissa ..	94	21
Hyderabad ..	11	3
Travancore-Cochin ..	10	3



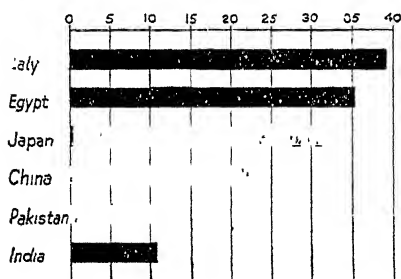
World Production of Rice

Countries	(Thousand metric tons)			
	1950	1951	1952	1953
World ..	150,600	152,200	159,300	168,600
China ..	46,700	48,300		
India ..	30,865	31,611	34,282	41,268
Pakistan ..	12,490	11,800	12,416	13,946
Japan ..	12,064	11,302	12,404	10,298
Indonesia ..	5,651	6,051	6,406	6,452
U. S. A. ..	1,755	2,077	2,182	2,383
Thailand ..	6,782	7,325	6,602	8,200
Philippines. ..	2,765	2,831	3,144	3,182

The normal yield per acre of clean rice in India compares very unfavourably with Japan, Egypt and Italy. Whereas the yield per acre in Italy is 79 bushels, in Egypt 51 bushels, in Japan 54.1 bushels, in China 37.5 bushels, in India it is only 20 bushels per acre. The yield per acre is influenced by factors like soil, rainfall and irrigational facilities. The yield varies according to season



Important rice-growing countries of the world



Yield of rice per acre in different countries

also. Generally, Boro crop gives the highest yield and Aus, the lowest.

Rice is the staple food of the people in the eastern part of India. Consumption within the country is so great that very little rice is exported. On the other

hand, India imports a considerable quantity of rice from other Asiatic countries, and principally from Burma, China, Thailand and Pakistan. Imports of rice from Burma during 1939-40 amounted to 1,767,000 tons as against 971,000 tons during 1952-53. The partition has very adversely affected Indian Union's position as a rice-producing and rice-consuming country. While, after partition, about 78% of undivided India's population remained in the Indian Union, only 70% of rice-growing areas have been included in the country. With the inception of the Second World War, India's imports of rice gradually increased and after partition, the position further worsened as will be evident from the following figures of India's imports of foodgrains.

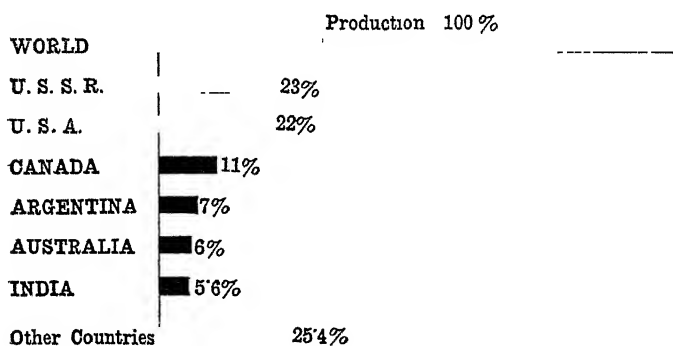
Year	Imports (in million tons)	Year	Imports (in million tons)
1947	2.33	1950	2.87
1948	2.84	1951	3.93
1949	3.80	1952	2.95

Rice
Import.

Since 1952 the position has somewhat improved and our imports are on the decline. Vigorous attempts are being made to attain self-sufficiency in this very important foodstuff. Introduction of mechanised cultivation and the adoption of the Japanese method of growing rice are expected to go a great way in meeting the much-needed demand for increased production. There is much scope for further extending cultivation of rice in the states of West Bengal Bihar, Orissa, Assam and Uttar Pradesh. The completion of the multi-purpose projects, especially the Damodar, Koshi and Mahanadi projects, will bring an additional one million acres under rice cultivation.

Wheat

India is one of the six chief wheat-producing countries of the world, but the internal demand is so high



Conditions
of produc-
tion.

Important wheat-producing countries of the world that very little is available for export. Indian wheat is harvested in early summer when there is great demand for wheat in European markets, and, as such, upto 1938-39 India used to export considerable quantity of wheat to Europe and fetch good price for it, but since 1942 there has been no export of wheat from India, because of greater

demand upon Indian wheat due to war and, subsequently, because of partition of the country in 1947 which deprived India of surplus wheat from Sind and West Punjab.

In India wheat is a winter crop sown after the rains and the harvest is collected just before the heat of the summer commences. During the seeding and germinating period wheat requires a moist and cool climate. Warmth is required when the heads of the stalks are being formed. Immediately before the grain begins to ripen a little rain is helpful, but for the ripening a dry sunny weather is essential. Wheat generally does not grow in a humid climate where the rainfall is more than 30" annually. In different parts of India the climatic requirements of wheat are obtained by adjusting seed-time and harvesting to the local climatic conditions. In this country it thrives well in clayey alluvial soil. It is also grown as a dry crop in black soil of the Deccan.

Successful cultivation of wheat involves employment of large amount of manual labour and, therefore, large-scale cultivation is possible only where large force of labour is available.

India's yield per acre compares very unfavourably with that of other important wheat-producing countries of the world. Within the country too, yield per acre differs in different States.

Average yield of wheat per acre in different States of Indian Union

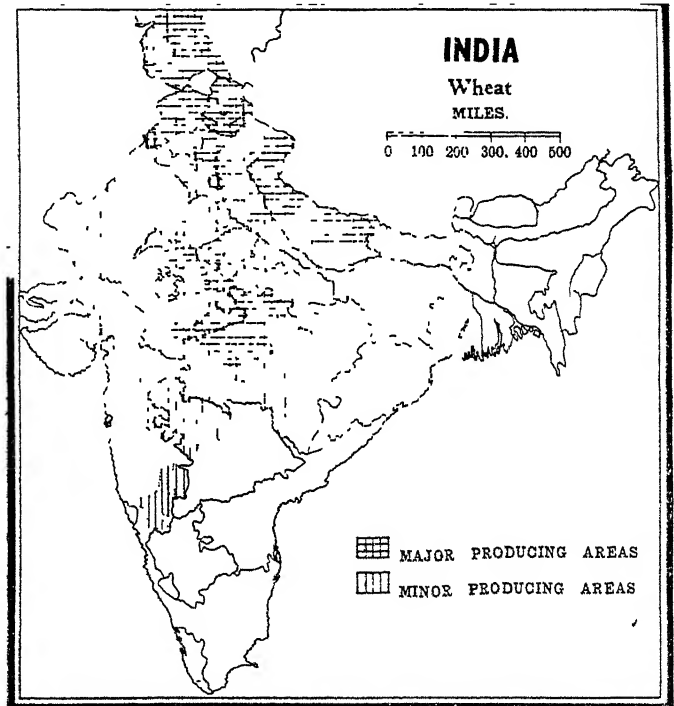
(lbs per acre)		(lbs per acre)	
Bihar	380	Madhya Bharat	354
Uttar Pradesh	792	E Punjab	720
Bombay	336	Saurashtra	672
Madhya Pradesh	537	Kashmir	896
Hyderabad	224	West Bengal	747
Average yield per acre 636 lbs.			

Variations in the condition of water supply account for this difference. It will be seen from the above table that

the yield per acre is the highest in those areas which are served by irrigation system.

**Areas of
production.**

The wheat belt of India stretches from the East Punjab to the north-western part of Bihar on the east and as far as the Dharwar district of Bombay on the south. The most important wheat fields, however, lie in Uttar Pardesh, the East Punjab, Bihar, Madhya Pradesh, Bombay



and Madhya Bharat. In those "scanty rainfall regions" of India where irrigational facilities have been extended as in the western part of Uttar Pradesh and in the East Punjab, wheat is cultivated as a winter crop. Wheat gradually disappears down the Ganges valley with increasing moisture, heat and rainfall. It is grown in some parts of West Bengal, but the quantity of produce is quite negligible. The chief wheat-producing districts of undi-

vided Punjab were Multan, Ferozepur, Attock, Shahpur, Montgomery, Gurudaspur, Gujranwala, Jhang and Lyallpur. The chief wheat-producing districts of Uttar Pradesh are Sahranpur, Dehra-Dun, Meerut, Shajahanpur, Etwa, Badaun and Nainital.

Area and Yield of Wheat in Indian Union 1950—51

State	Area (in lakh acres)	Yield (in lakh tons)
Uttar-Pradesh ..	82	29
East Punjab ..	30	10
Madhya Pradesh ..	25	6
Bombay ..	20	3
Bihar ..	14	2
Madhya Bharat ..	19	3
Hyderabad ..	4	0.4
West Bengal ..	1.2	0.4

The districts of Maldah, Murshidabad, Nadia, Birbhum and Burdwan in West Bengal grow wheat in small quantities for local consumption.

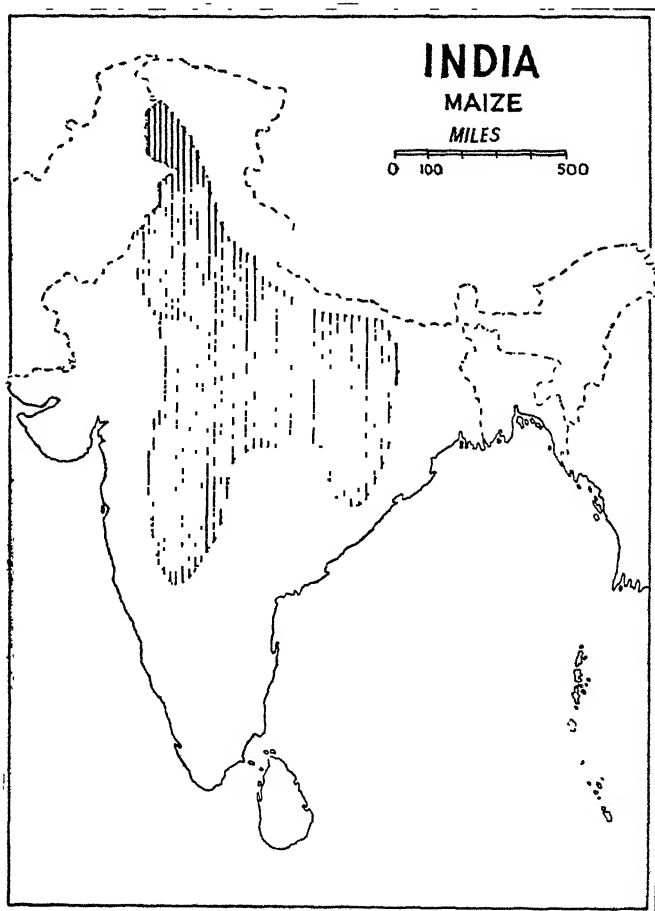
At present Indian Union is a net importer of wheat, and large amount of wheat is imported from Australia, Canada, U.S.A., Argentina, China and Pakistan.

Indian wheat suffers from inferiority of quality also. Most of the varieties of wheat fall within the definition of soft wheat commercially. But there are hard wheats (red and yellow) grown in Central India, which find a market in France and Italy.

Maize—It flourishes in areas having a warm climate and moderate rainfall. In the dry regions it is grown in association with millets and in the wetter regions with wheat. But it does not grow in areas having more than 60" and less than 20" of rainfall annually. A fertile loamy soil, capable of retaining moisture, is essential for its production. Where rainfall is not abundant water must be supplied by irrigation. It requires a uniformly high temperature with as little variation as possible throughout the growing period. Patches of maize fields may be found

Conditions
of
Production.

practically all over India but extensive cultivation is practised in the East Punjab, Uttar Pradesh, Bihar, Bombay, and Madhya Pradesh. The estimated area under Areas of Production.



this crop in 1952-53 was 8.7 million acres and the yield was 2.6 million tons. While maize is grown in other countries for fodder, in India it constitutes an important food-grain for poorer section of the people. The crop is raised mainly for consumption in the areas of production and trade in maize is insignificant.

Area and Yield of Maize in Indian Union

1948-49

State	Areas (in 1000 acres)	Yield (in 1000 tons)
U. P.	.. 2,330	770
Bihar	.. 1,515	370
East Punjab	.. 800	270
Bombay	.. 185	62
Madhya Pradesh	.. 152	35
Madras	.. 45	18
Orissa	.. 28	6
West Bengal	.. 87	31

Millets—In India a number of food crops are included under the heading of millets, of which the more important are Jowar or Cholum and Bajra or Cumbu.

Jowar constitutes the staple food of the agricultural population of the Deccan and also of some parts of the U.P. The straw is utilised as fodder for cattle. Bajra can be grown even without irrigation in areas having an annual rainfall of 20", and where again the rainfall is about 40" it does not grow. These are grown in the rains as well as in winter. They grow both in the black soil and in alluvial soil. The chief jowar-producing areas are Bombay, Hyderabad, Madras, M.P., U.P. East Punjab and Rajasthan. The bajra is extensively cultivated in Bombay, Madras, Uttar Pradesh, East Punjab, Rajputana and Hyderabad.

Area and Yield of Millets in Indian Union

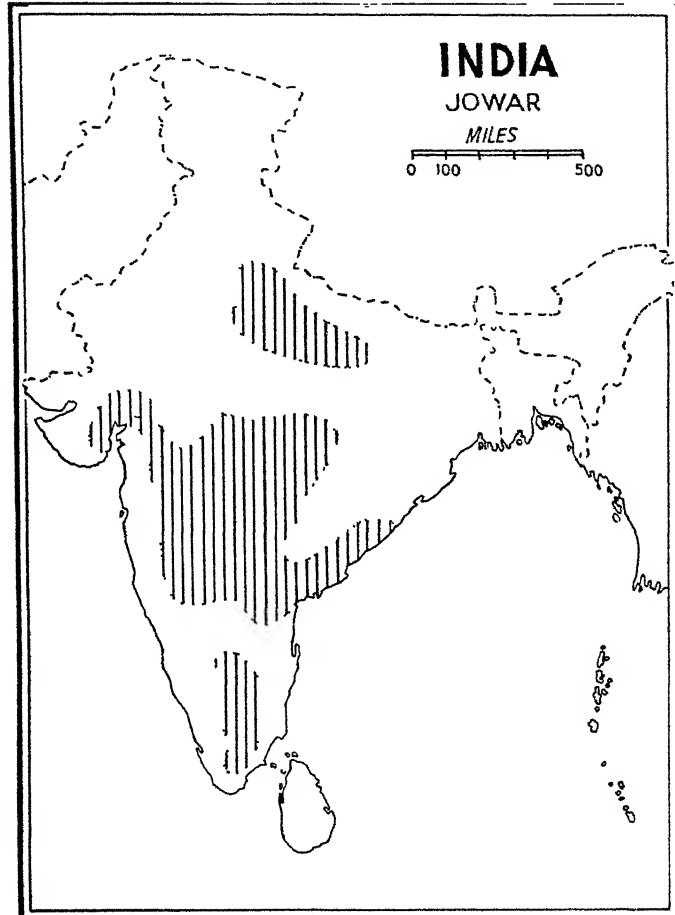
1952-53

	Area (in 1000 acres)	Yield (in 1000 tons)
Jowar	.. 41,945	6,038
Bajra	.. 25,282	2,922

Neither of these millets is at any time extensively exported. Arabia, Eden and French Somaliland are the principal importers. Bombay is the chief port of export.

Barley—It is very nearly co-extensive in its distribution with wheat. It is a short-season crop and has a wider range of climate than wheat. It is sown in winter and the harvest is collected in the early summer.

It can also grow well in scanty moisture supply and poorer soils. It grows best in the light and sandy soils. It takes much shorter period for growth than wheat or grain, and as such, whenever rain comes late, the farmer cultivates



Areas of
production.

barley as a substitute crop. It is mainly grown in Northern India and the U.P. has the largest acreage. In the U.P., the greater part is in the Gorakhpur, Banaras, Lucknow and Allahabad divisions. Bihar is another important barley-producing state.

Though in Indian Union an area of about 7.5 million acres is under cultivation of barley, and her total production amounts to 2.7 million tons, constituting about 5 per cent of the world's total production, owing to higher internal demand, her exportable surplus is quite negligible.

Oats—The cultivation of this crop is not very important in India. It is grown as a rabi crop in Delhi and in the Meerut district of Uttar Pradesh. It is also cultivated to a limited extent in the Poona, Ahmednagar, Satara and Ahmedabad districts of Bombay. The export trade of this crop is normally insignificant.

Pulses—Of the numerous species included in the category of "pulses" the most important are gram, arhar, lentils (masur), beans and peas.

Gram is probably the most important of the pulses grown in India. In 1952-53, it was sown over an area of more than 17 million acres of which the East Punjab and the Uttar Pradesh had the largest shares. Other important producing areas are Bihar, Madhya Pradesh, Bombay, Hyderabad and Mysore. The total estimated yield in 1952-53 was about 3.7 million tons. It is an important crop, specially in areas of rather scanty rainfall, not only because of its grain, but because being leguminous it adds nitrogen to the soil. Hence it is often grown with cereals and forms a good alternating crop. The major part of the crop is locally consumed and exports in years of plenty, are limited.

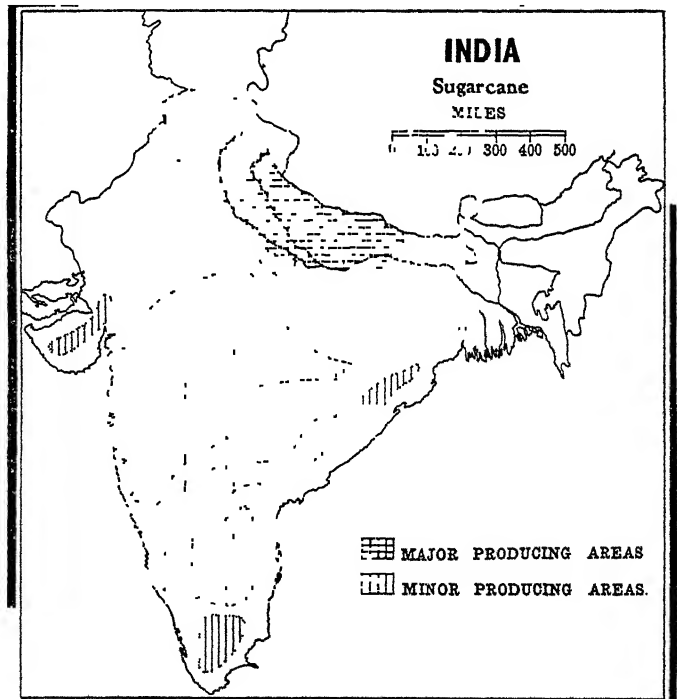
Of the other varieties the lentils or masur and arhar enter largely into the diet of the people. The minimum food requirement of the people in our country is either Dal-bhat or Dal-roti. The lentil is grown as a winter crop all over India, especially in the Madhya Pradesh, Madras and the U.P. Its nutritive value is very great. Arhar is grown as a mixed crop, usually in rotation with cereals. The total production of these two pulses is very great but the exports are negligible. The U.K., Ceylon, Straits Settlement, Mauritius and Burma are the destinations of our exports.

Sugar-cane—India is believed to be the original home of sugar-cane and sugar was produced and used in India even twenty five centuries ago.

Conditions
of
growth

It is essentially a tropical or sub-tropical plant and flourishes in a warm moist climate. An annual rainfall of 40 inches or a little more is ideal for the plant. Too much moisture reduces the sugar content in the juice. It grows best on rich, porous clays and on alluvial plains. Sea-breeze is wholesome for the plant. Cheap labour is essential for its cultivation. It requires sufficient manuring as its cultivation greatly affects the fertility of the soil.

Climatic conditions are very favourable for the growth of sugar-cane in India and it has probably the largest area



under cane-cultivation in the world. In India area under sugar-cane is estimated at about 5 million acres which

represent about 25 per cent of the total sugar-cane acreage of the world. Three-quarters of the area used for sugar-cane lies in the three States of Uttar Pradesh, Bihar and the East Punjab. Climatic conditions here are suitable for the cultivation of sugar-cane. Net work of rivers and canals provide facilities for irrigation. The soil is well-suited to cane cultivation and as the cane harvesting season in these States falls between the Kharif and Rabi harvests in which agricultural employment is small, usually plentiful supply of labour is available without any difficulty. It is also grown in West Bengal, Assam, Bombay, Madhya Pradesh, Mysore, Orissa and Hyderabad. Climatically and from the point of view of quality of the soil, southern India is more suitable for cultivation of sugar-cane and the average yield per acre of cane there is about four times as high as that in the north. Therefore, efforts should be made to extend sugar-cane cultivation in the peninsular India.

**Distribution of Sugar-cane cultivation in
Indian Union
1950-51**

States	Area under cane-cultivation (in Lakhs of acres)	Production (in Lakhs of tons)
Uttar Pradesh	25.0	28.9
Bihar ..	4.1	3.0
East Punjab	3.0	3.6
Madras ..	2.1	6.0
Bombay ..	1.8	5.4
Orissa ..	.7	1.1
Assam ..	.5	.7
Madhya Pradesh ..	.4	.5
West Bengal ..	.4	.8
Others ..	3.3	4.6
Total ..	<u>41.3</u>	<u>54.6</u>

The Uttar Pradesh has the largest area under sugar-cane in India. The chief producing areas are Gorakhpur, Azamgarh, Jaunpur, Ballia, Saharanpur, Bareilly, Meerut, Bulandshaher and Banaras. The important cane-growing districts of Bihar are Saran, Champaran, Muzaffarpur, Sahabad and Patna. East Punjab is the third largest sugar-cane producing State in India and the principal areas of production are Amritsar, Jullandhur and Rohtak. West

Bengal also produces large quantity of sugar-cane, though of poor quality, and the principal cane-growing districts are Birbhum, Burdwan, Nadia and Dinajpur. In Madras, the Chittoor district has the largest acreage under sugar-cane.

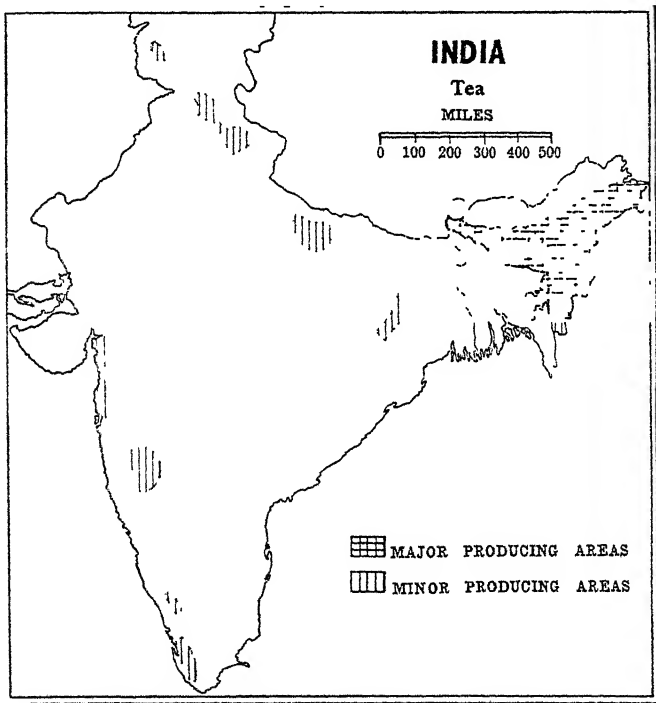
Indian sugar-cane is very poor in quality and her yield per acre too is the lowest in the world. In spite of cheap labour, the cost of production of Indian sugar is much higher than elsewhere in the world. Though the area under sugar-cane in S. India is small, the cane grown there is much thicker and finer than in northern India. India consumes all the products of sugar-cane. A few years ago, India was an important importer of sugar. Gur, the boiled juice of sugar-cane from which the molasses is not removed, is chiefly consumed by the people. Extension of sugar-cane cultivation in northern India which is not geographically ideal for this purpose, scattered holdings of the cultivators, long distance between the factories and the fields, failure to apply sufficient manures for cultivation of this exhaustive crop, backward methods of cultivation, etc. are some of the factors accountable for low yield per acre. Further, the practice of determining price of sugar-cane on the basis of weight and not of quality and content of sugar encourages cultivators to produce higher cane yields of low sugar content. Efforts should, therefore, be made to improve the quality and yield per acre of sugar-cane in India. The Indian Central Sugar-Cane Committee and the provincial agricultural departments are carrying on researches in this direction and the area sown with scientifically improved varieties of sugar-cane in the sugar-producing states continues to increase.

Conditions
of
production.

Beverage Crops:—Tea—India is the second largest producer of tea in the world. Climatically it is said to belong to low latitude areas where high temperature, long growing season, and heavy, well-distributed rainfall favour a rich, continuous and rapid growth of tender shoots. It is essentially a sub-tropical plant requiring abundant seasonal rainfall between 80" and 100" and a uniformity of relatively high temperature, ranging between 60° and 80°. It requires

deep, fertile, well-drained soil, rich in humus. Good drainage is essential as stagnant water spoils the roots and yet there must be abundant rainfall. That is why hill slopes are always preferred for the cultivation of tea plant. The huge production of tea in India is also largely due to the cheapness as well as regular supply of labour.

The plantation in India was introduced in 1834 "when Lord William Bentinck, the then Governor-General, unaware that the tea plant was indigenous in Assam, warmly took up the matter and appointed officers to proceed to China and



collect tea-seed and expert Chinese labour". The remarkable increase in the rate of tea production in India can be realised when we consider that in 1878 the area under tea was about 200,000 acres with an approximate yield of 38.5 million lbs., whereas, 70 years later, in 1948 nearly 840,000 acres under tea produced about 600 million lbs.

Areas of
production.

There are two distinctly marked tea-belts in India, one lies between 23° and 33° N latitude and the other in the Peninsular India between 10° and 13° N latitude. The first belt alone accounts for over 80% of India's total production of tea. Seventy-five per cent of the total area under tea lies in the Brahmaputra and Surma Valleys of Assam and in the districts of Darjeeling and Jalpaiguri in the State of West Bengal. The districts of Darang, Sibsagar, Cachar, Lakhimpur and the Sadia Frontier tract are the principal tea-producing centres in Assam. West Bengal occupies the second place in point of acreage and yield of tea, her share being about 25 per cent. of the total production. Apart from these two states, Purnea, Ranchi, Chotanagpur and Hazaribagh in Bihar, Almora, Kumayun and Dehra-Dun in Uttar Pradesh, Tripura State, and Kangra in the East Punjab and the States of Mundi and Sirum are the other important tea-producing centres in Northern India. The hill slopes over the Malabar coast in Southern India (including the States of Travancore-Cochin and the districts of Malabar, Nilgiri, Coimbatore, Coorg, Mysore and Satara in Bombay) yield about 20 per cent. of the total in Indian Union.

Area and Yield of Tea in Indian Union 1952-53

State	Acreage (in 1000 acres)	Yield crore lbs.	State	Acreage (in 1000 acres)	Yield lakh lbs.
Assam ..	380	27	E Punjab	9	15
W Bengal	196	15	U. P.	.. 6	17
Madras ..	81	5	Bihar	.. 3	22

Tea constitutes an important item in our export trade and India leads in the world's export trade in tea. More than 75 per cent of the total production is exported and this constitutes about 50 per cent. of world's trade in tea.

World's Trade in Tea 1950-51

			(in 1000 tons)
India	..	..	178
Ceylon	..	..	135
Indonesia	..	..	28
Japan	..	..	7
Pakistan	..	..	7

Tea is much in demand in foreign countries. The U.K. is the principal importer of Indian tea and formerly it was from Great Britain that tea was re-exported to different parts of the world. Canada, the U.S.A., Australia and the U.S.S.R. are the other recipients of Indian tea. The port of Calcutta handles the bulk of export of tea and the remainder is shipped from Madras.

Destination of India's Export of Tea 1952-53

			(in 1000 tons)
U. K.	..	..	116
U. S. A.	..	..	18
Ireland	..	..	10
Canada	..	..	12
Australia	..	..	8

During World War II India's export trade in tea enjoyed an unprecedented boom, as the other important tea-producing countries, barring Ceylon, were in the war zone and their production was severely affected, but with the cessation of the war, these countries have resumed their production of tea in the pre-war scale and have been presenting India with severe competition in the export trade of tea. Acreage and yield of Indian tea improved considerably under the impetus of war demand. This increased production and stiff competition in foreign markets in the post-war period precipitated serious crisis in Indian tea trade. To counteract the effects of this crisis vigorous efforts are being made to find new markets and increase home consumption considerably. Under the Tea Cess Act of 1953, a duty has been levied on all India tea exported. The Indian Tea Market Expansion Board spends the amount so collected in propaganda within the country for developing the tea-drinking habit of the people and in foreign countries for creating increased demand for Indian Tea. Attention should also be paid to lower the cost of production, improve the quality of tea exported and send tea in an improved packing condition. India is at present burdened with the problem of over-production, but efforts should be aimed at the direction of increasing foreign demand for Indian tea, and not at curtailing the present yield, as tea is one of the most important dollar-earning commodities.

Inter-
national
agreements.

The export of Indian tea had been regulated by the terms of International Tea Agreement since April 1933. Owing mainly to over-production in different tea-producing countries, its price fell below the cost of production in 1930-32, and the representatives of the tea industry from India, Ceylon and Java voluntarily entered into an Agreement to restrict the export of tea, as well as the extension of acreage under tea. This is known as the 'The Restriction Scheme'. It came into operation from 1st April, 1933 and continued for five years when it was renewed for another five years. During the war years of 1939-45, the scheme was suspended and India's quota was increased to meet the world shortage of tea. A new International Tea Agreement was signed on 1st April 1948 to which India was a signatory and the period of this agreement had been extended upto 1955. In 1953 India seceded from obligations under this agreement on the ground of distinctive treatment against her and has since set her own propaganda machineries in foreign countries and has established direct trade connection with them, independently of London market. In this connection mention may be made of the prospect of India's increased export to countries like the U.S.A., Canada, Australia and New Zealand.

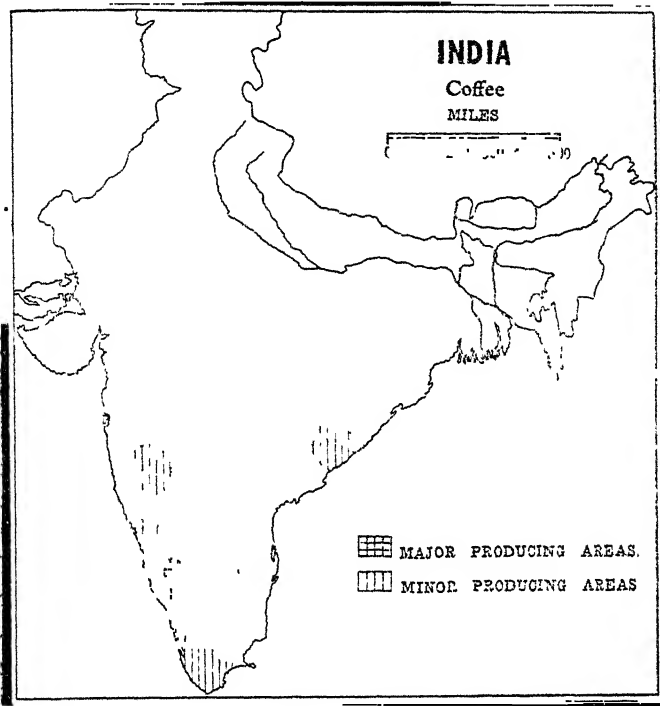
Conditions
of
production.

Coffee.—It is a produce of the tropical or sub-tropical lands. It requires a moderately high temperature and an abundant rainfall, but more important still is perhaps an equability of temperature and protection from the direct rays of the sun. A fertile and well-drained soil is also highly important. For that reason it thrives best at fairly high altitudes. It finds the most suitable environment on elevated land from which forest has recently been cleared. Soils for coffee should be rich in potash. In India coffee is sown and transplanted in the rainy season. It begins to ripen in October and hand-picking continues till January.

Areas of
production.

South India has the monopoly of coffee plantations. The most important plantations are in Mysore where more than 50 per cent. of the annual total output of India is raised. The plantations of Mysore are confined to the south and west in the districts of Hasan, Kadur, Mysore

and Shimoga. The Nilgiri is the most productive area of Madras. Coorg, Travancore-Cochin and Satara in Bombay are the other producing areas.



Distribution of Coffee Plantations in India 1950-51

States	Acreage	Yield (in 1000 lbs.)	Percentage of the total production
Mysore	101,000	16,200	45.6
Madras	43,700	9,100	26
Travancore-Cochin	2,950	500	1.4
Coorg	40,000	9,600	27

Systematic cultivation of coffee in India dates from 1830, but in 1866 many plantations were ruined because of a virulent disease attacking the coffee plant and the acreage under coffee declined since then. Since 1930-31 there has been an increase in the area under coffee under

the stimulus of better prices and at present about 200,000 acres are covered by coffee.

India is not a big producer of coffee in the world, being responsible for less than 1 per cent. of the total output. The average annual output varies between 15,000 to 20,000 tons usually. In spite of the insignificant position India occupies in the world's coffee production this country exports a considerable quantity of coffee to different parts of the world. This is chiefly because Indian coffee is superior in quality. Fifty per cent. of the annual production is consumed within the country. The bulk of our exports go to France, U.K., Germany, Holland, Norway, Belgium, Canada and Australia. The export trade is handled by the ports of Mangalore, Tellicherry, Calicut and Madras. Of late Brazil has been presenting India with very severe competition in her export trade of coffee.

Coffee
Cess.

By the Indian Coffee Cess Act of 1935, a duty has been levied on all Indian coffee taken by sea or by land to any place outside India and the Indian Coffee Cess Committee has been constituted to which the amount collected is handed over to be spent for promoting the sale and increasing the consumption in India. Agricultural and technological research to improve the quality and quantity has also been undertaken by the Committee.

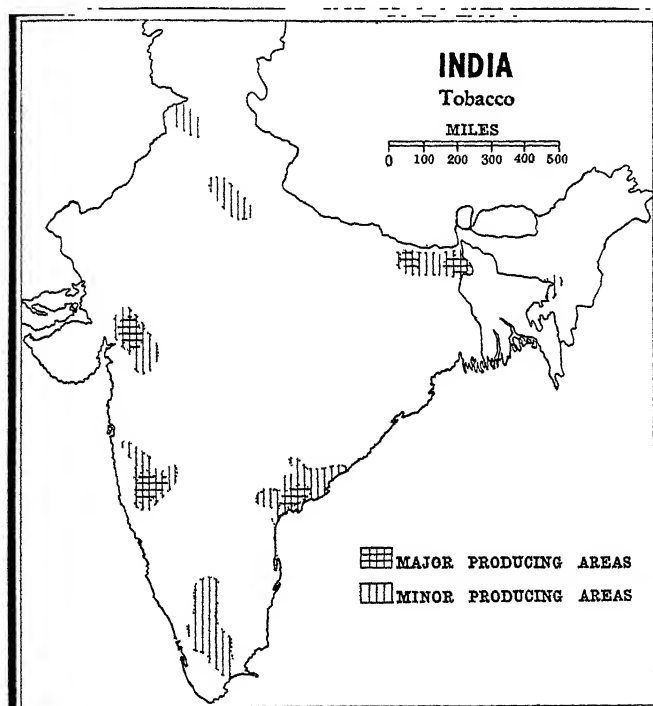
Narcotics and Drugs

Conditions
of
production.

Areas of
production.

Tobacco.—Although tobacco plant is a native of the tropics it has a wide climatic range. It requires a light soil, rich in humus, lime and potash. The soil requires liberal manuring as it is an extremely exhausting plant. It grows under different climatic conditions in different countries. In India greater part of the crop is harvested between February and April. In this country large-scale tobacco tracts are few in number although it is grown in small scale almost throughout the country. West Bengal, Bihar, Bombay, Orissa and Madras are the chief tobacco-producing states. In West Bengal, the main tobacco-growing areas are in the districts of Jalpaiguri and Cooch-Bihar.

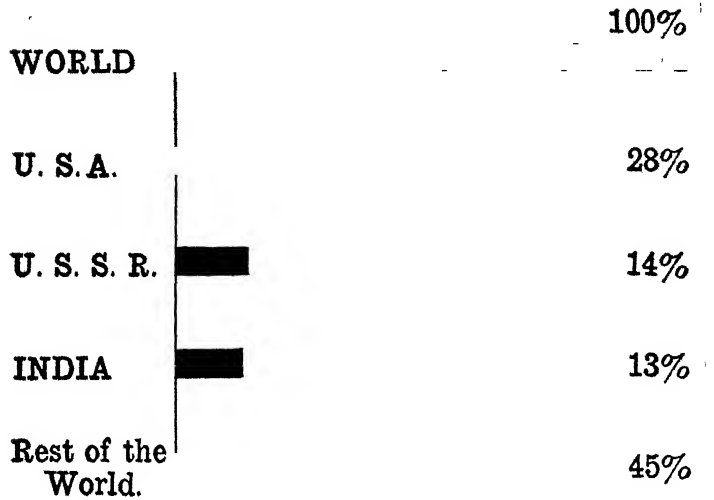
In Bihar the most important tobacco-districts are Muza-farpur, Darbhanga, Monghyr and Purnea. Guntur, Vizaga-patam, East Godavari, Coimbatore and Madura grow tobacco in Andhra and Madras. Varieties of virginia tobacco are grown in the Guntur district. In Bombay tobacco-growing regions are the Kairao, Belgaum and Satara districts and Baroda and the other Indian States. It is also cultivated in the districts of Jullundhar, Hosiarpur and Gurdaspur in the East Punjab and in the Bidar district of Hyderabad. West Bengal raises only cigar and hookka tobacco.



India ranks third among the tobacco-producing countries of the world, the other countries being the U.S.A. and China.

Year		Area (in 1000 acres)	Yield (in 1000 tons)
1950	..	860	264
1951	..	902	263
1952	..	659	192
1953	..	768	211

The Indian tobacco is inferior in quality and as such, does not occupy any important place in world trade. A large part of the tobacco grown in India yields a dark coarse leaf, unsuitable for manufacturing cigarettes. Attempts are now, however, being made to produce tobacco



of better types by introducing good foreign varieties. The bulk of the produce is consumed within the country and only 2 per cent. of the total output is exported.

The United Kingdom, Burma, Soviet Russia, China, Aden, Pakistan, Holland and Straits Settlements are the chief customers in normal times. India imports a large quantity of manufactured tobacco. The export trade in tobacco is handled by the ports of Madras, Calcutta and Bombay.

Chincona—This crop owes its importance to medicinal uses. It is mainly grown on government plantations in the Nilgiri Hills and Darjeeling. It is also produced in small quantity in Coorg, Mysore and Travancore. Considering the overall need of this malaria-infested country, the present production is far short of the country's requirements and the deficiency has to be supplemented by imports.

In recent years vigorous attempts on Government initiation are being made to increase the yield of this important crop.

Opium—It is also an important narcotic. Opium is prepared from the juice of poppy plants cultivation of which is mainly confined to tropical climate.

India is the largest producer of opium in the world. It is grown chiefly in U.P., Madhya Bharat, Rajasthan and the East Punjab mainly as a government monopoly.

India is also the largest exporter of opium in the world. In view of the International Agreement, India has been progressively reducing her volume of export of opium to the world markets.

Cotton—The cotton plant has a remarkable climatic range but it is basically a dry region crop. It does not flourish in areas having a rainfall of over 40" a year. Most of the Indian cotton is grown in areas having a rainfall between 20" and 40". A moderate rainfall, plenty of sunshine and uniformly warm weather without too much heat are the chief requirements of the cotton plant. The soil is another important factor. A rich, well-drained, salty soil, capable of retaining moisture, is ideal for cultivation of cotton, but it can be grown in poorer soils also. The bulk of India's product is obtained from the lavas region in the Deccan, that fertile tract of volcanic black earths and the adjoining territories. Another cotton belt of India stretches roughly from the U.P. to the East Punjab where the soil is mainly alluvial. "The area under cotton covers such a wide climatic range that the season for planting and picking are divergent in different parts of the country, and while in the Punjab and Sind the crop is entirely irrigated, elsewhere it depends for the most part upon the sufficiency and the timeliness of the monsoon rainfall". In India two varieties are mainly cultivated, namely, the early and the late. The former grows mainly in Central and Northern India and the latter in Southern and Western India. Taking both the crops into consideration the sowing season extends from March to August and

Conditions
of
production.

Areas of
Production.

the harvesting season from October to April. The early varieties take about 150 days and the latter varieties about 240 days to ripen.

As a cotton-producing country India ranks fourth in the world. The crop has fallen in acreage from about 21 million acres in the pre-war period to about 11 million acres at present, the yield coming down from about 4 million bales (of 400 lbs. each) to about 2·4 million bales against an internal requirement of about 4·2 million bales. The partition of the country has further adversely affected the position of India as a cotton-producing country and the partition has left India with about 1·3 million bales only of long-staple cotton against a requirement of more or less 2 million bales for mill consumption. Thus from surplus the country has come down to the position of a deficit country.

Area and yield of cotton

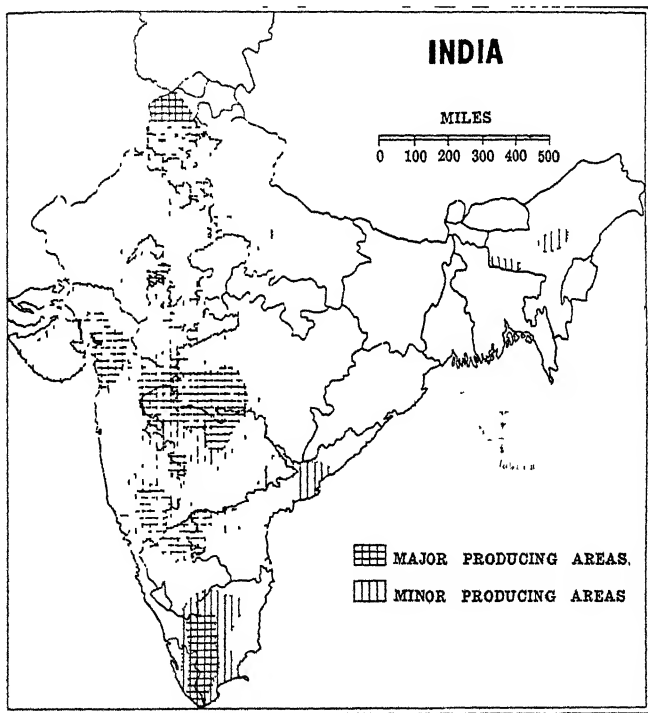
Year		Area (in 1000 acres)	Yield (in 1000 bales)
1950	..	16,213	2,628
1951	..	14,556	2,971
1952	..	12,173	3,134
1953	..	17,462	3,935

It will be seen from the above table that though the total acreage of cotton cultivation has fallen, the total yield has risen, recording a substantial increase in the yield per acre. That is due to introduction of improved method of cultivation and extension of irrigational facilities.

Areas of
production.

Bombay, Madhya Pradesh, East Punjab, Madras, Uttar Pradesh, West Bengal, Bihar, Assam, Baroda, Gwalior, Rajasthan, Mysore and Hyderabad are the principal cotton-growing areas. Bombay has the largest acreage under cotton. It is grown mainly in Gujerat, Broach, Surat, East and West Khandesh, Nasik, Ahmednagar, Sholapur, Dharwar and Belgaum. The States of Baroda, Sangli and Kolahpur are also important producers. In the Madhya Pradesh the most important tracts are Berar, Wardha and Nagpur. In Madras and Andhra the districts of Bellary,

Anantapur, Kurnool, Guntur, Tinnevely, Ramnad, Madura and Trichinopoly are the important growers of cotton. In the East Punjab the canal colonies and the south-eastern districts of Hissar, Rohtak, Gurgaon, Karnal and Ambala are the principal cotton-growing regions. Cotton is mainly grown in the west of the U. P. in the Bulandsahar, Muttra, Aligarh and Agra districts. Bankura and Midnapore in West Bengal and the Garo and Lushai hills in Assam are the chief cotton-growing areas. Saran and Ranchi are the important cotton-growing areas of Bihar. Mysore also raises a good type of cotton which satisfies the Lancashire

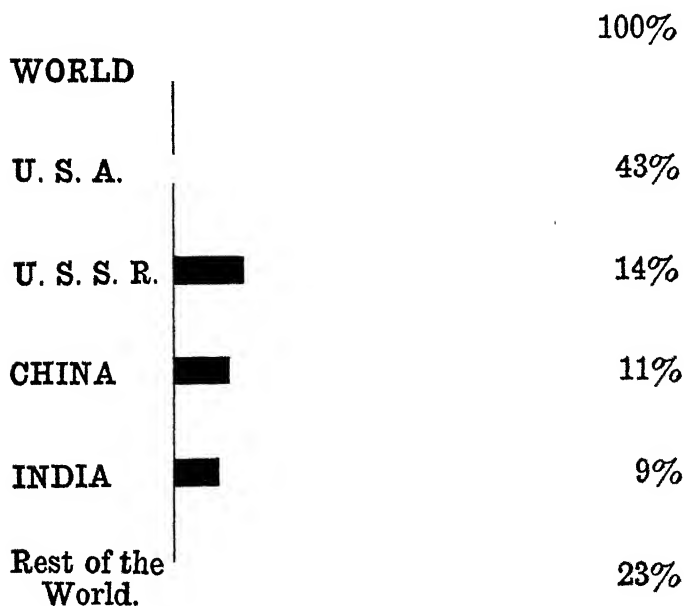


definition of long staple. But generally the crop is of short-staple and is unsuited for the manufacture of finer clothes.

**Distribution of Cotton Crop in
Indian Union
1951—52**

States				
Assam	12	thousand bales		
Bombay	3.5	lakh		
East Punjab	1	"		
Madhya Pradesh	4.5	"		
Madras	2	"		
Uttar Pradesh	44	thousand		

In the pre-partition years raw cotton was one of the most important items in the list of our exports and India was the second largest cotton-exporting country in the



world. Japan, China, the United Kingdom and Australia were the important customers of Indian raw cotton. Exports of cotton during 1940-41 were 2.2 million bales valued at Rs. 23,56 lakhs. Japan ranked first among the consumers of India's raw cotton. In 1941-42 and 1942-43 our exports appreciably reduced, due, mainly, to the closure

of the Far Eastern markets as a result of the war. Our exports further declined in the subsequent years on account of progressive increase in consumption by the mills in India. The export of raw cotton has now greatly declined because of the partition, which has deprived India of the important cotton-growing areas of Sind and West Punjab. At present India exports very small quantity of raw cotton and important buyers of Indian raw cotton are U. K., Japan, U.S.A., Australia, New Zealand, France and Belgium. India also imports considerable quantity of cotton from Egypt, Kenya, Uganda and the U. S. A. for the manufacture of fine fabrics. India also imports substantial quantity of raw cotton from Pakistan and cotton occupies an important place in the Indo-Pakistan Trade Agreement. Bombay and Madras are the leading ports of cotton export. Trade.

Need for extending the cultivation of cotton in Indian Union can hardly be exaggerated and attempts in this respect are being made to make the country self-sufficient in this essentially important agricultural product. Rajasthan, Madhya Bharat and Madhya Pradesh offer considerable scope for extension of cotton cultivation.

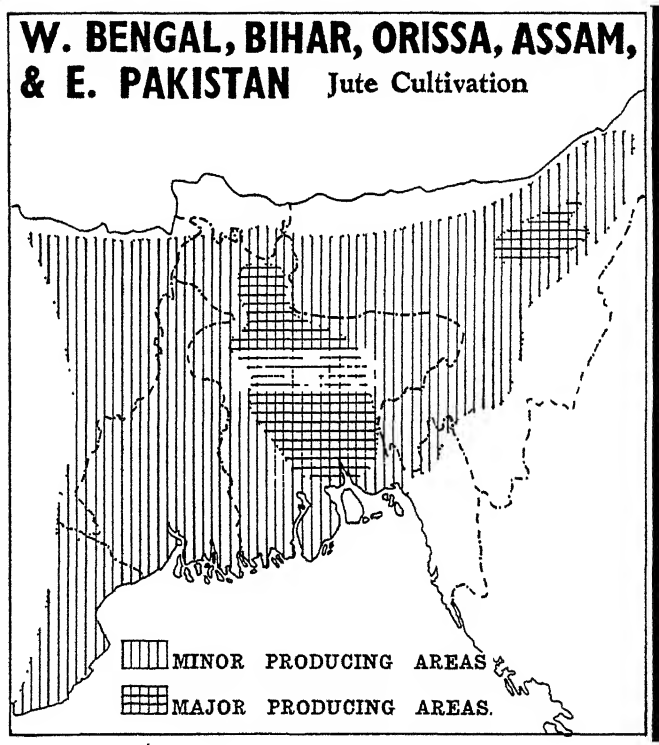
Jute :—Jute is the most important of all the bast fibres of India. Undivided India held the monopoly in the supply of jute in the world.

Jute is essentially a tropical crop. It thrives best in alluvial soil. It requires high temperature, ranging between 80° and 100° F and heavy rainfall, atleast above 80". Water-logging at a certain stage of growth of this crop is beneficial. Jute is a highly exhausting crop, and as such, the deltaic region of the Ganges and the Brahmaputra which is annually enriched by alluvial deposits by river inundation, is ideal for its cultivation. Sowing period of the crop extends from May to June and harvesting from July to September. Condition of production.

It is cultivated in the lower valley of the Ganges in West Bengal and there are lesser concentrations in Assam, Bihar and Orissa.

Distribution of Jute Crop in Indian Union 1951-52

	Area (in 1000 acres)	Yield (in 1000 bales)
West Bengal	.. 926	2,613
Bihar ..	.. 545	1,165
Assam ..	.. 380	860



The partition has seriously affected the position of India as a jute-growing country. Most of the jute-growing districts of Bengal and Assam have fallen in the share of East Pakistan which holds above 70 per cent of the total acreage and 80% of the total output of undivided India. Since partition Indian Union has become a net importer of raw jute. In 1953-54, the area and production were 1·20 million acres and 31·28 lakh bales as against the estimate

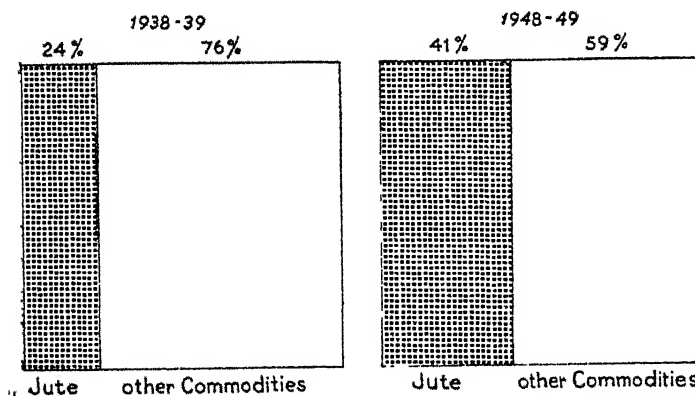
of 1'82 million acres and 46'05 lakh bales. Endeavour is being made to extend its cultivation in south Indian areas suitable in climate and soil for growing jute in them. Reclamation of fallow land, diversion of aus paddy lands and double cropping of aman paddy land are some of the measures adopted to secure an increase in jute production and the result has been a progressive increase of jute production in Indian Union.

Jute production in Indian Union during four years ending 1954

Year		Area (in 1000 acres)	Yield (in 1000 bales)
1950-51	..	1,454	3,301
1951-52	..	1,951	4,678
1952-53	..	1,834	4,695
1953-54	..	1,200	3,128

Although Indian Union exports raw jute, she is the largest exporter of manufactured jute. India exports manufactured jute to the United Kingdom, Canada, Australia, Argentina, U.S.A., Japan and Java. Jute is in great demand all over the world mainly because "no cheaper fibre is procurable for bagging agricultural produce". India also

Jute in India's Foreign Trade



exports raw jute in small quantity and her exports mainly go to U.K., U.S.A., France, Italy, Brazil, Germany, Belgium, and Spain. The port of Calcutta handles most of the export trade in jute.

Now that, due to partition, India has become deficit in raw jute, she has to import annually huge quantity of it from Pakistan. An all-out effort is now being made to make India self-sufficient in jute. Active steps are being taken by different states to grow jute in the hitherto-unproductive and fallow lands and to grow a variety of substitutes to supplement the country's deficiency in raw jute. Attempts are also being made to introduce improved methods of cultivation so that cost of cultivation may be lowered and the yield and quality of the produce may be improved considerably.

Varieties
and
production
in different
States.

Hemp—It is another fibre grown in India, chiefly, in the Madhya Pradesh, U. P., Bombay and West Bengal. Fertile, well-drained soil and moderate temperature and rainfall are essential for successful cultivation of this crop. Besides its utility as a source of fibre, it is also important for narcotics like ganja, bhang and charash.

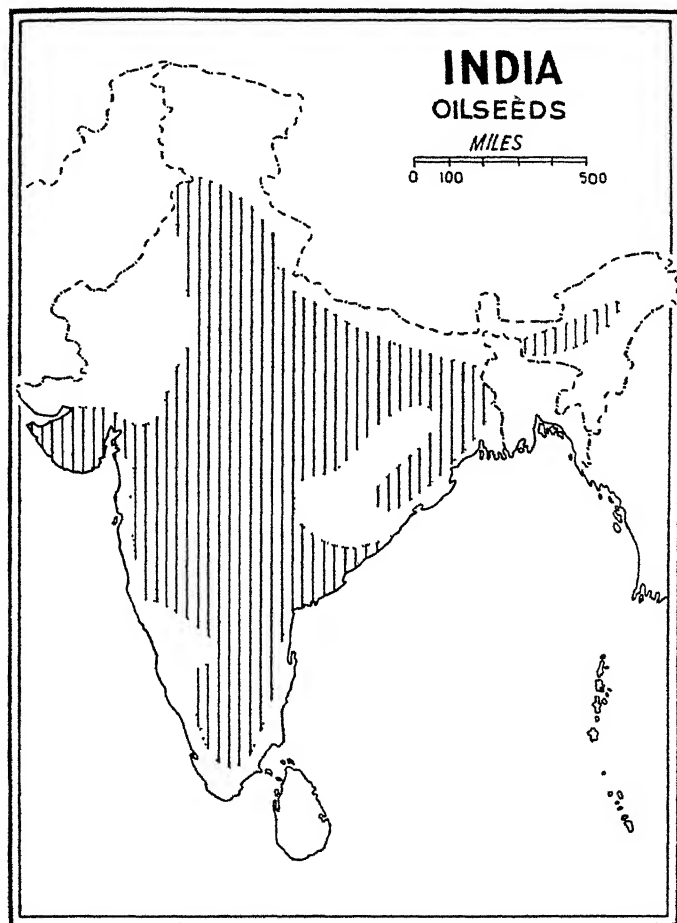
There are three principal varieties of hemp in India, namely, sisal hemp, sann hemp and Indian hemp. The commercial importance of sisal hemp is not very great in India and its cultivation is very small, confined, mainly, to Bombay and Madras. Sann hemp is the most important and it is grown in Bombay, Madras, U. P., and Madhya Pradesh. Indian hemp is more important for narcotics and is grown in Kashmir, Nepal, Simla, Kumaon and Kangra.

Of all the varieties, only sann hemp enters into export trade. The United Kingdom, Belgium, Italy, France and Germany are the principal buyers of Indian sann hemp. It is largely used for manufacturing cordage and canvas.

Oil-seeds—The trade in oilseeds is very recent in India. Oilseeds have demand not only for food and salads, but also for preparing medicines, perfumery, varnishes, lubricants, candle and soap manufactures and other purposes.

The importance of oilseeds in the Indian economy is indicated by the fact that more than 25 million acres are devoted to their production, equivalent to about 8 per cent of the net area sown with crops in the whole of India. Indian Central Oilseeds Committee Act which was passed in 1946 was intended to promote the improvement and

development in the cultivation and marketing of oilseeds and oilseeds products.



Area and Yield of Oilseeds in Indian Union

		Area (in 1000 acres)	Yield (in 1000 tons)
1950-51	..	25,053	5,078
1951-52	..	25,551	4,820
1952-53	..	26,159	4,635

The principal oilseeds found in India are :—Linseed, groundnuts, cotton-seeds, rape-seed, castor-seed, sesamum-seed, coconut, and mowra-seed.

India is one of the leading oilseed—producing countries of the world. The most remarkable fact is that she raises almost all the principal varieties of oilseeds and in the production of some of them India holds the monopoly. A large quantity of oilseeds is exported annually and the export of oilseeds forms a large item in India's foreign trade. It is felt that India does not yet make the best use of her oilseed resources, though attempts have been made to develop a local oil-crushing industry. In recent years there has been a decline in our export trade in oilseeds. This is due partly to increased internal demand and partly to increased production in other oilseeds-growing countries, such as, the U. S. A., Brazil and Argentina. In the past few years, particularly during and after the second world war, there has been greater demand for oilseeds in India for industrial purposes, such as, manufactures of soaps, varnishes and lubricants. With further industrialisation the internal demand of the country will be still more increased. Simultaneously, there is great scope for further production of oilseeds in the country. But it should be seen that increase in the production of oilseeds is not effected at the cost of foodcrops. Lands not suitable for production of foodcrops should be utilised for this purpose. Oilseeds may also be cultivated in off seasons. The fact that inspite of increased production in other countries, there is yet great scope for further intensifying our export trade in oilseeds and thus earn valuable foreign-exchange, is another pointer to the need for stimulating further production of oilseeds in the country.

Linseed

Linseed is cultivated in Madhya Pradesh, Bihar, Orissa, Uttar Pradesh, Bombay and West Bengal. It is a winter crop, being sown from August to October and harvested from January to April. A summer variety is also grown in Madras.

India is the second largest linseed producing country in the world and produces about 16 per cent of the world's total output. It is grown in about 3·3 million acres, yielding more than 350,000 tons annually.

Linseed is primarily a rain-fed crop and grows well in areas with annual rainfall between 30 and 70 inches. Uttar Pradesh is the leading producer of this crop, followed by Bombay.

Practically, the whole of the output is exported, in normal times, to Japan, United Kingdom, France, Belgium, Italy and Holland. Indian linseed faces severe competition in Europe from Argentine linseed. Bombay handles the bulk of the exports.

Groundnut is one of the most important oilseeds and has exhibited rapid growth within recent years. Today India is the leading groundnut-producing country in the world. It is a tropical crop and grows well in peninsular India. Ground-nut.

Nearly 80 per cent of the groundnut area is concentrated in Madras, Bombay and Hyderabad and the important varieties grown are the Coromandal and the Peanuts. Bold nuts grown in Saurashtra with a lower oil content are valued for eating. It is grown mostly in Madras, Bombay, Mysore, Hyderabad and Madhya Pradesh. In Northern India a considerable quantity is raised in Uttar Pradesh.

The groundnut cultivation has become a major agricultural operation in India and the crop is now estimated to occupy nearly 42 per cent of the area under all oilseeds and 4.4 per cent of the total area sown under all main food crops in the Indian Union.

The oil is used for culinary purposes either as such or in the form of the hydrogenated product known as Vanaspati.

India exports considerable quantity of groundnuts and groundnut oil annually, and recently her export of these two items, particularly of groundnut oil has increased considerably. The principal buyers are France, Belgium, Austria Hungary, Italy and the United Kingdom. The chief ports of export are Madras and Bombay.

Sesamum.

Sesamum is known to the trade as til or sesame. It is a kharif crop grown in a little less than 4 million acres with an yield of more than 340,000 tons in normal years. The cultivation of sesamum extends to almost all the provinces of India, but the crop is raised most extensively in the U. P. and Madras followed by Rajasthan, Hyderabad and Madhya Bharat. About one-fourth of the world's total output is raised in India. The importing countries of Indian sesamum are Belgium, France, Germany, Italy, Egypt and the U. K. The chinese competition is affecting India's trade in the seed. In recent years the importance of this crop as an article of export has declined considerably due to increased internal demand. In India the crop is important as an edible oilseed.

Castor-seed.

Castor-seed is a non-edible oilseed. India holds a virtual monopoly in the production of this seed. The plant is principally grown in Madras, Hyderabad, Bombay and Madhya Pradesh. In recent years the average acreage and yield has been in the tune of 1'4 million acres and 130,000 tons.

About 70 per cent of the crop is available for export either as seed or as oil. India commands the largest share of the world's export trade in this seed. In recent years India's export of castor seed has considerably declined and, on the other hand, her export of castor oil has proportionately increased. The principal buyers are the United Kingdom, France, Belgium, Italy, Germany, Spain, Canada and the United States of America. Castor oil is used in soap-making as well as in manufacturing medicine. It is now being used also as a lubricant.

Rape and Mustard seed.

Rape and Mustard seed is another variety of important edible oilseeds. These are rabi crops accounting for about 4'3 million acres and a little less than 800,000 tons in normal years. Uttar Pradesh grows well over half the rape and mustard seeds in India. Other important producing areas are Bihar, East Punjab, Assam and Rajasthan.

India at present holds almost a monopoly in rape seed. A large quantity of rape and mustard seed oil is used

within the country, specially in West Bengal for cooking purposes. Rape seed is exported to the United Kingdom, Italy, Belgium and France.

Coconut is an important oil-yielding tropical fruit. It provides many useful products to mankind. The Kernal of the ripe nut in its raw state finds wide use in culinary preparations or is dried and converted into copra and crushed for oil. Cocount oil is greatly in demand for edible purposes as well as for the manufacture of soaps and toilet preparations. The tender nuts afford a refreshing drink. Its leaf and timber are extensively used for constructing houses. In India it grows luxuriantly in the coastal and deltaic tracts and also in the interior of Mysore. India's share in the world acreage and production comes to 1.5 million acres and 3400 million nuts respectively. The bulk of this produce comes from the plantations located in the strip of land lying on the west coast of India between the Arabian Sea and the Western Ghats extending from the Konkan in the north to Cape Comorin in the south and falling within the territories of North Canara of Bombay, South Kanara and Malabar districts of Madras and Travancore-Cochin. The districts of Tanjore, Godavari and Vizagapatam in Madras and Andhra, Mysore, Orissa and West Bengal also possess appreciable areas under the crop. To rehabilitate the industry and promote research on better or more efficient production and, and marketing of coconuts, a statutory body, the Indian Central Coconut Committee, representing various interests, was constituted by an act of 1944.

About 45 per cent of India's production of mature nuts is utilised for making copra, while an equal quantity is used for edible purposes such as curries, chatneys, sweets, pudding etc.

Though India is the second largest producer of coconuts, her production is far short of her requirements.

Cotton-seed is also an edible oilseed. The oil is used in cooking, in pharmacy and in the preparation of lard and margarine. It is naturally a by-product of cotton cultiva-

Cotton seed. tion and is extensively grown in India. Bombay, the East Punjab, Hyderabad, Madras and Madhya Pradesh are the chief producers, the average annual production being above 2 million tons.

Rubber. *Rubber*—India occupies an insignificant position among the rubber-producing countries of the world, its output barely amounting to one per cent of the world's total.

In raw or modified form, rubber is used for an immense number of purposes. Vulcanised rubber is more elastic and less porous than raw rubber, and is used for such things as tyres, springs and buffers, gas and water pipes, fire hose, door-mats, dolls, machine-belted, all sorts of water-proof coverings, cushions, beds, etc. The useful substance known as vulcanite or ebonite is produced by adding increased quantity of sulphur ; and it is of great value in the construction of electrical apparatus, stethoscopes, speaking tubes, etc. It is black, hard, horny, and capable of a high polish, and is not acted upon by acids or alkalis.

Areas of production. The cultivation of raw rubber on a plantation was undertaken in Travancore-Cochin, Malabar, Coorg, and Mysore in the early years of the present century. The cultivation of rubber is mainly confined to Southern India. The production of rubber in the country at the present time is of the order of 16,000 to 17,000 tons. Of the total number of rubber estates and holdings 72·85 per cent are located in Travancore, 8·19 per cent in Cochin, 16·55 per cent in Madras (mainly Malabar) and remaining 2·41 per cent are in Coorg, the Andamans and Assam.

The cultivation of rubber is dependent upon availability of cheap labour and on a well-developed system of communication. Peninsular India furnishes these two conditions and the rubber plantations in Southern India employ more than 30,000 people.

The annual production of rubber exceeded consumption by large quantities every year from 1925 to 1933 and world stock at the end of 1933 was equal to almost one year's

production. In May, 1934, an agreement was reached among the main producing countries to regulate production and exports. The previous restriction scheme only urged the producers to restrict this output to a definite percentage of their full capacity, the fluctuation of percentage being governed by the demand and the resulting price-levels. The new scheme was comprehensive in the sense that not only it included practically all the important areas of production, but also exercised control over wild as well as plantation rubber. India also is a party to this agreement and exports of rubber are restricted by the Indian Rubber Control Act of 1934. The permissible exportable amount for any year is the quantity of rubber equivalent to the percentage fixed for the period by International Rubber Regulation Committee as the percentage of the basic quota which may be exported during that period. If the net exports are in excess or deficit, adjustments are made from the permissible amounts of the next year.

Rubber
Restriction
Agreement

Indian rubber is mostly raised for foreign markets. The principal buyers of Indian rubber are the United Kingdom, Ceylon, Holland, Strait Settlements and Germany. U. K. alone accounts for about 40 per cent of our total exports. Cochin is the principal port of export.

The Indian rubber manufacturing industry, though not well-developed as yet, is capable of absorbing our entire output. But the cost of production of Indian rubber is comparatively higher than in other rubber-producing countries, and as such, our home industry imports annually considerable quantity of raw rubber. Since last several years the position has improved in favour of the Indian rubber producers and at present the Indian manufacturing industry consumes the total quantity of rubber produced in the country.

During the Second World War, the Government of India stopped all exports of rubber and itself purchased the entire output. After the war and with the revival of the free market, Indian planters experienced great hardship owing to severe competition presented by low-priced imported

rubber. Indian cultivators urged upon the Government to place an embargo on import of rubber, but the Government wisely rejected the proposal in the interest of the nascent rubber manufacturing industry of the country.

The Indian Rubber Board was constituted under the provisions of the Rubber Act of 1947. The Board is responsible for efficient production and marketing of the rubber industry and for advising the Government on matters relating to imports. The price of rubber produced in the country is fixed statutorily.

Spices.—Indian Union produces varieties of spices and some of them are produced mainly in the South. Of the Indian spices, pepper, chillies, ginger, cardamons, cinnamons, cloves, and betel nuts are the most important. India is, however, in short supply of many of the spices and has to import them.

Pepper.—It is a native of Southern India. Its production is confined to the submontane tracts of the Western Ghats and it is also extensively grown in Madras, Travancore and Assam. The total acreage is estimated to be over 195,000 acres producing about 31,000 tons in a normally good year.

Most of the produce is locally consumed leaving little surplus for export to European markets.

Chillies.—are widely grown in West Bengal, Madras, Bihar and Bombay. They are mostly grown for local consumption.

Ginger is grown mainly in Bombay, Madras, Uttar Pradesh and West Bengal. The bulk of the production goes to meet local demand and only a small quantity is exported to European markets.

Cardamons are grown in the forests of southern and western India and cinnamons in the Western Ghats of south India. Madras, Mysore, Bombay and Travancore are the principal growing areas. In recent years there has been a remarkable expansion in the cardamon-growing industry.

It is estimated that the present acreage amounts to over 120,000, about 50 per cent. of which is situated in the Cardamon Hills in Travancore-Cochin and the remainder in the States of Coorg and Mysore and in the districts of Madura, Tinnevalley, Malabar and Coimbatore. The total production is estimated at about 1350 tons.

Cloves are chiefly grown in the foot-hills of the Western ^{Cloves.} Ghats. The production is insufficient to meet the internal demand.

Betelnuts are grown mainly in West Bengal and South ^{Betelnuts.} India, *arecanuts* being also grown in the same areas.

Fruits & Vegetables

India suffers from an overall shortage of fruits and vegetables, which keeps the first almost totally out of reach of the general mass of people and due to which the latter is an sufficient unit of popular food, considering the dietary ^{Varieties} habits of the people. The present annual supply of fruits ^{of} and vegetables amounts to 1·5 and 1·3 ounces per adult per day as against the diet of 3 ounces and 10 ounces respectively. The area devoted to fruits and vegetables is in the order of 2 per cent of the total sown area. Mango, oranges, bananas, apples and pineapples are the important fruits grown in various parts of the Indian Union.

Mango is extensively grown in West Bengal, Assam, Bihar, Madras, Bombay, Uttar Pradesh and the East Punjab.

Oranges are extensively cultivated in Madhya Pradesh, West Bengal and Assam.

West Bengal, Madras and Assam are the principal areas for producing bananas.

Pineapples are also grown extensively in these three States.

Apples are the fruits of the cooler and drier regions of the Himalayas. East Punjab and Kashmir are the important producing areas.

Questions

1. What do you understand by 'cash crop'? Discuss the geographical conditions necessary for the growth of three most important cash crops of India and note their distribution.
2. Describe the cultivation of cotton, sugar and rice in India. To what reasons do you attribute the low productivity of these crops in India as compared with the other countries of the world?
3. Discuss the conditions of the growth of rice and tea in India, mentioning their principal areas of production. Add a short note on 'terrace cultivation'.
4. India is suffering from the shortage of rice and jute. What would be your suggestions to increase the supply of both but not at the cost of each other?
5. Narrate the conditions favouring the cultivation of the different plantation crops of India and indicate the areas best suited to their production.
6. Name the two important fibres produced in India. Give an account of the conditions favourable for their large-scale production and their manufacture into finished products.
7. Name the five important oil seeds of India, describing the areas where they are produced and the uses to which they are put.
8. Discuss the conditions favourable for the production of jute. Name the principal buyers of Indian jute manufactures.
9. Draw a map of India showing the areas producing sugar-cane, tea and coffee.
10. Where and under what geographical conditions do the main crops of India grow?
11. What are the chief areas in India where tobacco and silk are produced? Describe the climatic conditions which favour their growth.
12. Examine the importance of any four of the following:
(a) Ground nut, (b) Linseed, (c) Rice, (d) Wheat, (e) Jute and (f) Cotton.
13. Discuss the conditions favouring the growth of (a) tea, (b) coffee and (c) sugar-cane. Indicate the places where they are grown.
14. Briefly narrate the conditions favourable for the growth of rice and wheat. What parts of India are best suited for the production of these crops?
15. Give an idea of wheat, cotton and jute belts of India. State briefly the climatic conditions necessary for the production of these commodities.
16. For making India self-sufficient in the matter of food what planning would you advocate?
17. What are the uses of jute? How is it that jute is produced only in India?

18. Describe the system of irrigation in vogue, in India; and compare the systems of irrigation in northern India with those of the Deccan.

19. Explain the present and proposed schemes of generation of hydro-electricity in India. How does India stand as a producer of hydro-electricity in comparison with the other countries of Europe and Asia?

20. Describe the various methods of irrigation in India. Indicate the regions where each is practised.

21. Discuss the irrigation system in India. Also state what you know about the Damodar Valley Project.

22. Indicate the influence of irrigation on the development of agriculture in pre-partitioned India.

23. Mention three important food-crops grown in different parts of India and the conditions favouring such growth.

CHAPTER III

LIVESTOCKS

Animals play an important part in the economy of India. They supply power for agricultural operations like ploughing, carting and drawing of water for irrigation, provide us with food and clothing and act as beasts of burden. It is because of their great importance that animal husbandry finds a place in the Constitution of India. For, ^{Animals} in Article 48 included in the "Directive Principles of State Policy" it is laid down that the state shall endeavour to organise agriculture and animal husbandry on modern and scientific lines and shall, in particular, take steps for preserving and improving breeds, and prohibiting the slaughter of cows and calves and other milch and draught cattle. ^{in India.}

India is one of the largest livestock countries in the world, possessing about a fourth of the world's cattle, *i.e.* 75 per 100 acres of cultivable land and 60 per 100 persons of population. In addition, India has sheep, goats and other animals consisting of horses, mules, donkeys and camels all of which play a vital part in the national economy of the country. The distribution within the country is heterogeneous in density and breeds vary from the best variety to the poorest.

India's Livestocks & Livestock Products

			Livestocks (in thousand No.)		
			1940	1945	1951
Cattle	..	..	1,37,929	1,36,739	1,55,099
Buffaloe	..	..	40,125	40,732	43,351
Sheep	..	..	41,506	37,728	38,829
Goats	..	..	50,253	46,302	47,077
Horses & Ponies	..	..	1,780	1,398	1,514
Mules	..	..	55	40	60
Donkeys	..	..	1,186	1,131	1,239
Camels	..	..	617	656	629
Pigs	..	..	2,702	3,709	4,420
Fowls	..	..	55,062	14,666	67,135
Ducks	..	..	2,346	3,581	6,264
			Products (in lakh maunds)		
Cow Milk	..	..	2,013.95	2,062.44	2,430.64
Buffalo Milk	..	..	2,435.53	2,619.71	2,665.64
Goat Milk	..	..	134.46	133.35	107.10
Ghee	..	..	—	—	117.27
Butter	..	..	—	—	20.35
Meat (in tons)	..	..	—	—	4,61.245
Skins (in tons)	..	..	—	—	367.98
Wool (in lbs.)	..	..	—	54,533,589	36,767,761

Cattle.

Cattle—Cows are reared chiefly for milk and bullocks provide the traction power for ploughing the land. Cattle form the backbone of India's economy. It is a significant fact that best breed of cattle are generally found in dry areas and inferior type of cattle in areas of heavy rainfall. The rainfall map of India more or less coincides with her cattle map. Thus East Punjab, Rajasthan, Saurashtra, Mysore and drier parts of Bombay and Madras are homes of some of the best cattle in India, while cattle of inferior quality are found in areas of heavy rainfall, like Assam, West Bengal, Orissa and Malabar Coast. The position of Indian cattle has not improved due to the following causes :

- (1) Refusal of orthodox Hindus to destroy old and diseased cows on religious grounds,
- (2) lack of food,
- (3) promiscuous breeding,
- (4) want of grazing lands,
- (5) unscientific method of rearing animals, and
- (6) want of cross-breeding.

The agricultural prosperity of India depends greatly upon the quality of cattle breeds and a sufficiency of their numbers. In India certain breeds of cattle are known for their high milk-production, while others for their high

class powers. A third category of animals combine in themselves a moderate degree of efficiency for production of both milk and work.

Cattle wealth in some Countries (in crores)

	15
INDIA	
U. S. A	8
U. S. S. R.	5
BRAZIL	4.2
ARGENTINA	3.4
CHINA	2.2

India has about 155 million cattle. There is great scope for improvement in the quality of the cattle and the development of dairying in a large scale.

Buffaloes—Indian buffalo is superior to Indian cow. Buffaloes.
They thrive better than oxen in regions of heavy rainfall but are also found in the drier parts of India. Buffaloes are found mainly in Uttar Pradesh, East Punjab, Bihar and Madras. The best known buffaloes are of East Punjab, Jaffarbadi buffaloes of Kathiwar and the Surti and Pandharpuri buffaloes of Bombay. They are mainly used for transportation and tillage.

Sheep and Goats—India possesses over 38.8 million Sheep and goats.
sheep but their quality is inferior to those of other countries. The wool is coarse and the meat poor. Sheep are reared mainly on the dry upland pastures unsuitable for cattle. The woolly sheep are found in Coimbatore, Mysore, large portion of Deccan, Rajasthan, East Punjab, Bihar and West Bengal. Bengal and Patna sheep are noted for their good yield of wool and fatty mutton. The Delhi-Hausi sheep are the finest and the largest animals in India.

Goats thrive in dry regions and they are prized for milk, meat and hides. The Himalayan goats are noted for

their hair. India's goats number about 48 million. Goats are found in large number in Madras, Uttar Pradesh and Hyderabad, but they are reared almost everywhere in India.

Horses.

Horses are mainly used for transport. The Kathiwar breed of horses, known as Kathi, is famous for its great powers and endurance. The Marhatta pony, the little Gujarat and Deinthadi of the Deccan are also famous. The ponies of Manipur are regarded as the best in India. Indian pigs belong to two principal species, namely, Indian wild boar found throughout India and pigmy hog in the forests at the base of the Himalayas in Nepal, Sikkim, and Bhutan. Pigs are useful for bristles, lard, meat (pork, ham, bacon) and skin. Mules and donkeys are also found in large numbers in India.

Poultry.

Poultry : In India poultry is divided into two groups—(1) Fowls comprising hens, cocks and chickens, (2) Ducks comprising ducks, drakes and ducklings. The total poultry for 1951 was estimated at 7·3 millions, out of this Part A states have 77 per cent., Part B 20·9 per cent. and Part C 1·5 per cent. In recent years poultry-keeping has been receiving a good deal of attention in all the states of Indian Union.

Animal Products

Animal products.

The chief animal products in India are hides and skins, wool, bones, ivory, tallow and dairy products. Bones are used as manure, and for manufacture of buttons, handles, toys, glue and as a source of superphosphates. The term hides denotes the raw, dressed or tanned skins of bullocks, cows, buffaloes, etc., while the term skins is restricted to those of calves, sheep, goats, deer and other wild animals. Hides and skins are used for making harnesses, bags, suitcases, machine belts, shoes, gloves etc. Supply of horns comes from U.P., E. Punjab, Madras and West Bengal. Buttons, toys, manure, glue, gelatine, etc. are made by horns. Ivory is used for the manufacture of ivory goods, bones and teeth. Their supply comes from Assam and Mysore. Tallow is derived from the fat of beef, mutton

and goats. It is primarily used as an adulterant, lubricant, and illuminant and in the manufacture of soaps and candles.

Hides & Skins

In normal times India exports large quantities of raw and tanned hides and skins to Europe and America. Hides and skins valued at Rs. 26 crores are produced annually. The following table shows the exports of raw and tanned hides and skins from India :

Exports of Hides & Skins

		1947-48		1948-49	
		Raw	Tanned	Raw	Tanned
		Rs	Rs.	Rs	Rs.
Hides	..	1,24,86 000	7,10,59,000	48,70,000	4,96,44,000
Skins	..	6,12,43,000	6,64,09,000	4,98 12 000	7,20,50,000

The U.S.A., Germany, U.K. and France are the principal buyers of hides and skins from India. The leather centres are Kanpur, Agra, Calcutta, Delhi and Madras. Indian hides are of poor quality, being derived mostly from the diseased, old and naturally dead animals. Comparatively few animals are killed for meat. In Western countries, hides and skins are the by-products of the meat industry. Negligence of the butchers is also responsible for the spoiling of the hides and skins. It is felt that India has not made the best use of her ample resources of hides and skins. The demand for products of the leather industry is gradually increasing in India, but India's tanning industry is not much developed. Modern methods of tanning have been adopted in Bangalore, Madras, Cuttack, Kanpur, Agra, Gwalior and Calcutta.

Hides &
Skins

Wool

The annual production of wool in India is approximately 36.7 million pounds. The wool of the Indian sheep is short stapled and much inferior to that of Europe and Australia. They are generally suitable for the manufacture of blankets, rugs, carpets and felt, but Bikaner wool is of good quality.

Wool.

Wool
producing
areas.

Production is mainly concentrated in the north-western part of the country, comprising Kashmir, East Punjab, Uttar Pradesh and Rajasthan. This tract accounts for nearly 80 per cent. of Indian production of wool. The yields in this area are also comparatively high. In southern and eastern India, although there are a large number of sheep, the production is low on account of poor yields. Madras, for example, has the largest number of sheep, about three times as many as in the Punjab, but the production of wool is only about 40 per cent. of the latter province. The sheep of Mysore and Hyderabad states are also poor producers of wool.

The internal consumption of home-made wool is small as it is unsuitable as a clothing material and a large quantity of wool is imported by Indian woollen mills from Australia and South Africa. In the pre-war days the United Kingdom was the chief customer for Indian wool. Some wool is also exported to the United States of America.

Milk.

Dairy products. Dairying on a large scale is almost undeveloped in India. The industry is indigenous throughout India. The chief products are milk, butter and ghee. The annual production of milk in India has been placed in the neighbourhood of 500 million maunds. The milk is mainly obtained from cows and buffaloes although goats also supply a large quantity. India stands second to the U.S.A. in the volume of her milk production. In spite of the huge output of milk, the consumption of milk per head in this country is the lowest in the world. The supply of milk in big cities is inadequate as grazing space is not available in the congested cities and quick transport of pure milk from rural areas is difficult to arrange for. This has resulted in a serious shortage causing heavy infant mortality. Hence it is necessary that dairies on a large scale should be started in villages and in the neighbourhood of cities and arrangement should be made for the fast transport of milk to the markets. The development of this industry on a cooperative basis will not only improve the condition of the Indian ryot but will also solve the problem of milk supply. Besides milk, ghee, butter and cream are

also produced. Ghee has an important place in the dietary of the Indians. Although it is produced throughout the length and breadth of the country, the U.P., Rajasthan, North Bihar, Madras and Madhya Pradesh produce ghee in large quantities. The chief centres of butter industry are Bombay, Ahmedabad and Aligarh. The butter is skimmed for internal distribution and foreign export. This industry has a bright future. The annual production of ghee in Indian Union is about 14 million maunds. Of the total quantity produced about one-third is consumed locally, another one-third finds place in inter-state trade and the remainder is exported to Straits Settlements, Malaya, Ceylon, South Africa, Mauritius and Hong Kong.

Silk—Two-thirds of the total output of this fibre comes from Mysore. Of the other varieties of silk, 'Mulberry' silk is grown in the districts of Murshidabad, Malda and Birbhum of West Bengal, Dehra Dun and Partabgarh of the U.P., Gurdaspur of East Punjab and in Kashmir where it is a state monopoly. 'Tasar' silk is produced in the Madhya Pradesh and Chotanagpur division of Bihar, 'Endi' silk in the Jalpaiguri district of West Bengal and in Assam; and 'Muga' silk in Assam and Manipur.

Fisheries in India

India is remarkable for its abundant fish fauna which account for the large section of its population depending on fishes as the staple protein dish. Fish is eaten by nearly 50 per cent. of the population. It is an important active food in West Bengal, Orissa, Assam, Bombay and Madras, but owing to the very limited supplies not more than a few chhataks of fish per head per week is available. The minimum need of the fish-eating population is 2 chhataks, at an average, per head per day. The recent statistics compiled by the Food and Agricultural Organisation show that India falls within the lowest consumption area for fish. Her per capita consumption is only 3 to 4 lbs. per year, although she has resources to increase it ten fold.

Ghee and
Butter.

Fish.

Production and consumption of fish

Production			(1948) in thousand mds.
Sea	..	..	.. 10,078·9
Fresh water fish	..	..	.. 4,073·5
Total	..	..	.. 14,152·4
Quantity available for consumption			.. 13,020·0
Population (in millions)			.. 348·83
Per capita consumption (in lbs.)			.. 3·07

India has a coast line of roughly 3500 miles differing from zone to zone in physical features and nature of sea-bottom, thus providing a wide and varied range of fishing and seasons in the year. The arid Kathiwar Coasts, the monsoon-bathed Konkan and Malabar, the dry, hot, sandy peninsula around Kanyakumari, the Coromandal and Orissa indented with deltas of large rivers and lakes, and finally the clayey and sandy coast of Bengal into which the gigantic Ganges and the Brahmaputra pour their rich contents, offer infinite varieties of fishes and seasons.

Similarly, the extensive back waters, estuaries, lagoons and swamps, rivers, streams and channels and a very large number of perennial and semi-perennial lakes, beels, tanks, ponds and other stretches of water, a large proportion of which is culturable, offer great scope for development of inland fisheries.

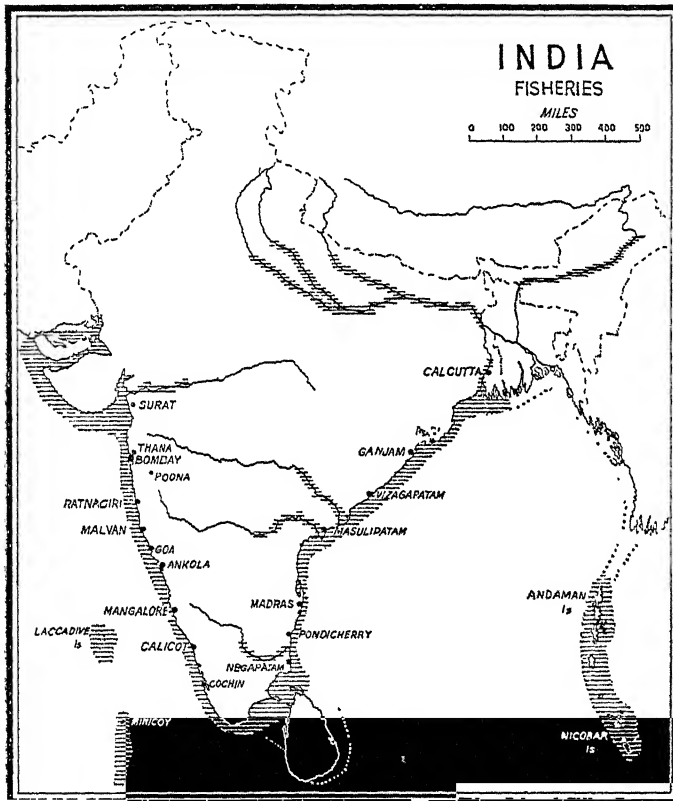
Closses of
fisheries.

There are three main classes of fisheries in India, namely, (1) Inland fisheries, (2) Estuarian fisheries and (3) Deep-sea fisheries.

Fresh water
fisheries.

Inland or Fresh-water fisheries exist in almost all the provinces. These are the cheapest and quickest sources of fish supply in any country. India is today perhaps more advanced than most of the countries of the world in inland pisciculture. West Bengal leads in fresh-water fishing, followed by Orissa, Assam, Bihar, Uttar Pradesh and Madras. The consumption of fresh fish is also the highest in West Bengal. The inland fisheries of Madras suffer from this disadvantage that many of the rivers dry up in summer. The principal rivers of West Bengal with their branches and tributaries offer enormous possibilities for fresh-water fishing. Rohu, Mirgal, Catla, Hilsa, etc. are

the best varieties of fish obtained. The Hilsa moves up the rivers during the rains for the purpose of spawning and goes back to the sea in winter. There are also innumerable tanks and jheels in West Bengal which yield a huge quantity of fish. Inland fisheries, as a source of food, have unlimited possibilities of development, provided sound cultural methods, more or less similar to agricultural practices,



are adopted for increasing the supplies of suitable fishes. Tank fisheries should be improved so that every village and every town will be more or less self-sufficient in the fish requirements. The habit of the people, their fishing implements and the method of catching, all require a drastic change. Development of fisheries on cooperative

basis will help supplementing the present shortage in food supply and at the same time offer employment to quite a large number of the unemployed youth.

Estuarian.
fisheries.

The estuarian fisheries are mainly in the Sundarbans. These fisheries are situated at a great distance from the markets, so their development depends mainly on the provision of better modes of transport. Extensive culture of mullets, Bhatki, etc. should be practised in selected areas and within the vicinity of tidal supply of salt water. Introduction of modern fishing crafts and tackles can help in this direction. Refrigeration and cold storage are the only means by which fresh fish can be preserved. So quick freezing centres should be set up near about the places of capture.

Sea-fishing.

The large gap between production and requirements of the country can only be made up by the exploitation of our extensive marine resources. Fishing in Indian seas is, however, confined to a narrow coastal belt of five to ten miles only. This is largely because the equipment used for sea fishing consists mostly of boats, catamarans and of small nets and tackles which cannot stand the requirement of off-shore or deep-sea fishing. Catamaran—(Kattumaram—lashing timber—Tamil) is an ingenious type of simple, keel-less boat, made of two or more pieces of timber, is best suited to stand the peculiar conditions of the Coromandal shelf. Masula boats are also ideal for shore fishing of this coast. The common boats of the Malabar Coast are 'dug-out canoes'. Machwas of Ratnagiri coast are different from the above and are designed for deep-sea fishing. 'Padavai' are plank-built boats of Konkan Coast for mackarel fishing by 'Rampani' net. All over India the fishing vessels, nets and tackles that are used today are what they were centuries ago. Boats and crafts, ingeniously constructed of indigenous timber, ply the waters. These are manned by men who rely on weather and wind for their luck. Consequently, the range of fishing in Indian waters has never been more than ten miles from the shore. Beyond this zone, lie vast untapped areas, to be exploited by modern mechanised boats. These fishing people, poor as they are,

have acute problem of procuring nets, timber for boats, sailing cloth, fish hooks and coal tars, etc. The mechanisation of fishing operation has become an absolute necessity.

To start deep-sea fishing on a commercial scale, the first requisite is to collect essential data regarding fishing grounds, the type of crafts and gear that would be suitable, the species of fish that may be available in different parts of the sea, in different seasons and similar other essential information. An indispensable factor in the economic utilization of fish-catches is proper storage ; refrigeration is the modern solution to the problem. Owing to the high cost of installation, refrigeration plants are not economical for India. Bombay has 22 in operation. The Fisheries Department of Bombay has blue prints to put up more in all fishing centres and landing places through cooperative and Fishermen's Societies on a subsidy-cum-loan basis. Again, for the lack of adequate transport and other facilities, it is estimated that more than 50 per cent of our fish production is being cured in various ways. A large quantity is consumed in this country but a lucrative export trade in this commodity with Ceylon and other countries has also been established. More than 150 fish-curing yards have been established by Government along the coast of India.

Sea-fisheries are mainly confined to coastal waters of Bombay, Madras and West Bengal. The coastline of Madras is margined by a shallow water area suitable for feeding and spawning of fish. But the vessels used are primitive rafts which are made of logs of timber tied side by side and this type of vessel does not go further than 3 miles from the coast, and want of good harbours also is a serious disadvantage. The fisheries of Bombay are mainly sea-fisheries. Bombay has a long coastline with excellent harbours and the fishermen of Bombay are very efficient. Sea-fishing is as yet little developed in West Bengal. There is an unlimited supply of edible fish in the Bay of Bengal. The bay also possesses all the characteristics of a good fishing ground. But no systematic effort has yet been made to exploit this aquatic wealth of Bengal. Moreover, Bengalees

do not like the taste of sea-fish. This distaste can be removed by constant propaganda and proper selection of fish. Sea-fishing is also carried on in the coastal waters of Orissa and Gujerat. All state governments possessing sea-boards should take up the matter energetically. India in general and West Bengal in particular will be much benefited economically by the development of sea-fisheries. The development of our fisheries was fully realised as a result of the food shortage at the end of the World War II. The Government of India set up a small central organisation and took steps to develop fisheries in this country, such as financial and technical assistance under 'Grow more Food Campaign' and also help to the States for implementing their approved schemes of fisheries development in the form of loans and subsidies. Improvements in the direction of undertaking research-pilot experiments and training etc., will result in fundamental and lasting benefit to the development of fisheries. Two fisheries research stations have been established, one for marine at Mandapan in South-India, and the other for inland fisheries at Barrackpore near Calcutta. Some of the States are also engaged in research work with the object of training fishery workers to meet the requirements of State Governments.

Seas around India are rich in variety of fishes. Plenty of sharks are available in the Bay of Bengal, Arabian Sea and also along Coromandal and Konkan Coasts. Sardines, herrings and shads form the bulk of our food fishes and rank first in commercial importance. Mackerel, horse-mackerel and porches come second. The other remaining marine fishes are jew-fishes, Indian salmons, cat fishes, bombay ducks, pomfrets, mullets, silver-bellies, ribbon-fishes etc.

By-products

Besides articles of food, fish yields several by-products. The most important is fish oil, such as sardine-oil and shark liver oil which are now being manufactured on commercial basis in India. The oil is used for the manufacture of paints, soft-soaps, chamois-leather for softening hides and for tempering steel, batching jute, and after hydrogenation, for the preparation of edible fats. It is being

manufactured by the Government of Bombay, Madras and Travancore. Indian fishes, such as salmons, jew-fishes, cat-fishes, are yielding Isin-glass, a valuable article for the clarification of wines. Fish scraps are converted into fish meal as additional protein food for poultry and livestock. Fish refuse is being dried as manure. Fish-curing is also an important supplementary trade. The chief methods of curing fish in India are sun-drying or salt-curing, Sun-drying is the most simple, economical and practical method for smaller fishes. In salt-curing, fishes are treated with salt in required proportions.

India exports Rs. 208 lakhs worth of dry fish mainly to Ceylon, Burma and Malaya. A number of varieties of fresh fish is also exported to America, though on a small scale.

Questions

1. Describe the geographical conditions determining the world distribution of beef cattle and dairy cattle. Why has not cattle rearing developed as an organised industry in India ?

2. Why are the principal fishing grounds of the world located in temperate water? Mention the principal fishing grounds of the world with their chief exporting centres. Why are the fisheries of India little developed ?

3. Describe the location and physical characteristics of the principal fishing grounds of the world. Examine the present position and future prospects of the fishing industry in West Bengal.

4. What are the essential conditions for the development of fishing industry? Do you think that West Bengal and Assam possess such facilities ?

5. State the conditions necessary for the development of the fishing industry and the provinces in our country which possess such facilities.

6. Examine the present position and the future prospects of fishing industry in West Bengal.

CHAPTER IV

FORESTS AND FOREST PRODUCTS

Extent. The forests in India play an important part in the country's agricultural and economic development. The forests cover 160,400 square miles or about 21 per cent. of the land surface of the country. The role of forests in conditioning the weather, and in preventing the erosion of soil have yet to be appreciated. In India the great variations of climate result in the existence throughout the country of widely different types of forests. Indeed, the variety and abundance of Indian forest products are perhaps unequalled in any other similar area in the world.

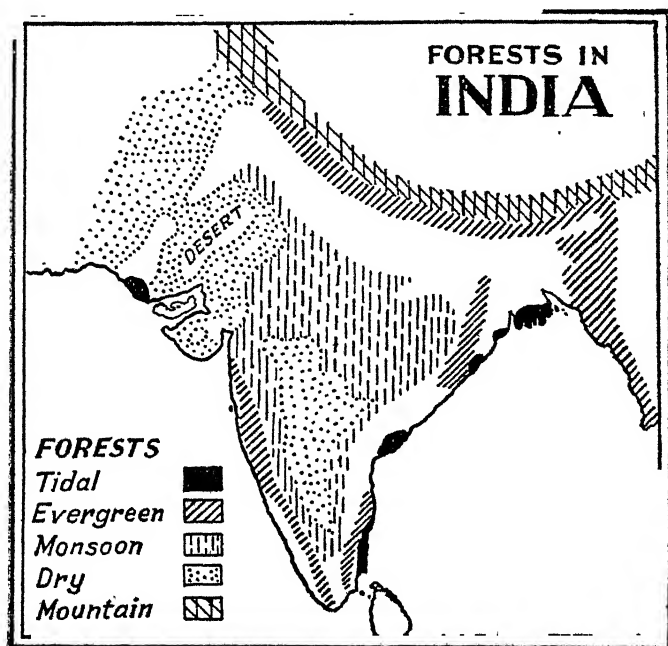
Classification. The main types of forests in India :—

Evergreen forests. (1) Evergreen forests occur in areas having more than 80 inches of rainfall annually, i.e., along the slopes of Western Ghats, the eastern Himalayas upto 5000 ft. and in Assam. They contain valuable timber trees, such as teak, ebony, rosewood, ironwood, bamboos, neem, tamarind and varieties of palms. The trees are large-sized and yield very remarkable and useful timbers which are in great demand for house and ship-building, bridges, railway sleepers, furniture, etc.

Deciduous forests. (2) Deciduous or monsoon forests are naturally found in areas having more than 40 inches of rainfall annually. The trees are deciduous and they shed their leaves in the hot season. The two most useful trees of such forests are the sal and the teak. The teak is now obtained mainly from the western parts of the Peninsular India and the sal from the north-east of the Deccan and the lower slopes of the Himalayas. Rosewood, sandal wood, ebony and mango are the other important trees.

Mountain forests. (3) Mountain forests of evergreen trees like those of temperate lands are found on the Himalayas above 3000 ft. and on the mountainous tracts of the Deccan above 5000 ft.

Some of the trees belong to the Oak species (broad-leaved) and some to the coniferous type (needle-shaped pine). In the E. Himalayas and Assam oaks, magnolias and pine trees are the characteristic trees. In the N. W. Himalayas deodar is the chief timber tree.



Distribution of Forests in India

(4) Tidal forests grow in river deltas and along the sea coast where it is flat and swampy. The characteristic trees belong to the mangrove family. These forests produce sundri wood utilised in making boats, masts and wheels. These forests are found in the Sunderbans of Bengal and northern portion of the Madras coast.

(5) Dry forests occur in arid regions of the Punjab plain and Rajputana. The most important tree is the babul, the bark of which is a good tanning agent.

India produces annually about 27,411,700 sq. ft. of various wood (both timber and fuel wood). It is estimated that the forest of India amounts to 10,78,35,00,000 sq. ft.

The annual income of the Government of India from Indian forests is about 10'48 crores.

The forests are divided into four classes, first, protective forests, those which are necessary for the prevention of soil erosion and floods, secondly, timber forests which form a source of revenue to government ; thirdly, minor forests which chiefly supply fuel, fodder and timber to local population, fourthly, pasture lands. Forests are further classified into Reserve forests, Protected forests and Unclassified forests. In reserve forests there is strict control of forest officers ; in protected forests the local villagers usually have right of grazing, fuel and fodder-cutting with permission from forest officers. In unclassified forests, there is no systematic attempt at their management.

Utility.

The existence of large tracts of forests is of great benefit to every country. In India the value of the forests lies in the fact that they provide timber and fuel wood, grazing and fodder for the cattle and edible fruits and roots for human beings. Neglect of her forests in the past has caused India serious and permanent disadvantages. Many fine forests, specially the historic forests of the Gangetic plain, have been sadly depleted, due to reckless destruction of forest trees. However the task of preservation of forests has been seriously undertaken by the government. The forest wealth of India is divided into two main groups—(a) Major produce—i.e., timber and fuel wood, and (b) minor produce—i.e., bamboos, lac, essential oils, tarpentine and resins, dyeing and tanning materials, and herbs and spices. A very small proportion of the country's vast forest areas has, as yet, been exploited for the extraction of timber, owing to the difficulty of transport from the remote and inaccessible regions in which they occur. As a result, there is an enormous wastage of good timber for which no commercial use can at present be found. The best known timbers exploited now are Sal, Teak and Deodar. The sal forests are found largely in the Ganges Valley, Sub-Himalayan tracts, Assam, Chotanagpur, Orissa and Madhya Pradesh. The timber is very hard and durable. The teak forests occur mostly on the Western

Forest products—major and minor.

Ghats, Nilgiris and Central India. Indian teak is not of a very good quality. Deodar forests occur in the north-western Sub-Himalayan tracts and are found to exist at an elevation of 5000 to 8000 ft. The timber is moderately hard and very durable. It is used extensively in making furniture and in constructional work and is in large demand for making railway sleepers. The minor products obtained from Indian forests supply important raw materials for the industries and are also in wide demand in foreign countries. India has, practically, a monopoly of lac industry and its export is of great value. *Lac* is resinous material secreted by an insect which lives as a parasite on certain kinds of tropical trees. It can be marketed roughly in its natural form as stick lac or refined in seedlac or further refined into shellac or button lac. Lac is collected almost all over India, but it is obtained in sufficient quantities from the two main areas :—(1) Central India, Chotanagpur, Orissa, Bihar, Madhya Pradesh, and the north-western forests of Hyderabad State and from (2) Assam. Shellac obtained from the lac is used in the manufacture of varnish, gramophone records and insulators. Oil obtained from sandal wood is used in the manufacture of soaps. Resin obtained from the pine and Chir trees is used in a number of industries such as paper-making, soap-making, etc. Myrobalans found in Madhya Pradesh, Orissa, Madras, Bombay, West Bengal and other places provide valuable tanning materials. Bamboos are now being utilised in paper-making. Though Indian forests grow spruce and silver fir in large quantities, yet difficulties of transport render their exploitation difficult and inexpensive.

Distribution of Forest lands in different States of Indian Union

States	Area (sq miles)	Forest lands (sq. miles)	Percentage of forest land
Ajmer ..	2,367	593	25.1
Andaman & Nicobar Islands ..	2,500	2,500	100.0
Assam ..	55,445	21,637	39.0
Bihar ..	69,745	9,947	14.0
Bombay ..	76,026	12,872	16.9
Madhya-Pradesh ..	98,573	47,057	47.7
Coorg ..	1,582	1,175	74.3

Distribution of Forest lands in different States of Indian Union—(Contd.)

States	Area (sq. miles)	Forest lands (sq. miles)	Percentage of forest land
Punjab	.. 38,780	4,761	12.3
Madras	.. 1,25,163	33,666	26.9
Orissa	.. 32,695	4,492	13.7
Uttar Pradesh	.. 1,06,248	17,372	16.4
West Bengal	.. 28,215	4,284	15.2

Preservation of forests in India—The preservation of forests has become a national problem in India. India has been losing its forest wealth for the following reasons :—
(a) Progressive exhaustion of soil, (b) reckless burning for lack of alternative fuel, (c) erosion of land. For this reason various schemes are being mooted out. In 1950 Vana Mahotsava was originated to instil among the masses a love for trees. This national festival is held every year.

Questions

1. On a sketch map of India, show the regions with important timber resources. How are these utilised at present? Discuss the projects of increasing exports of Indian timber to the world's markets.
2. Is India rich in forest products? Mention the regions where these are available and their principal uses.
3. What do you understand by the term 'afforestation'? State the regions of India that are best suited for this purpose.
4. Show how the distribution of the different types of forests is controlled by rainfall in India. What are the principal forest products in this country?
5. Where are India's most important forests? Give instances of the uses to which Indian forest products are at present put and discuss their future possibilities.

CHAPTER V

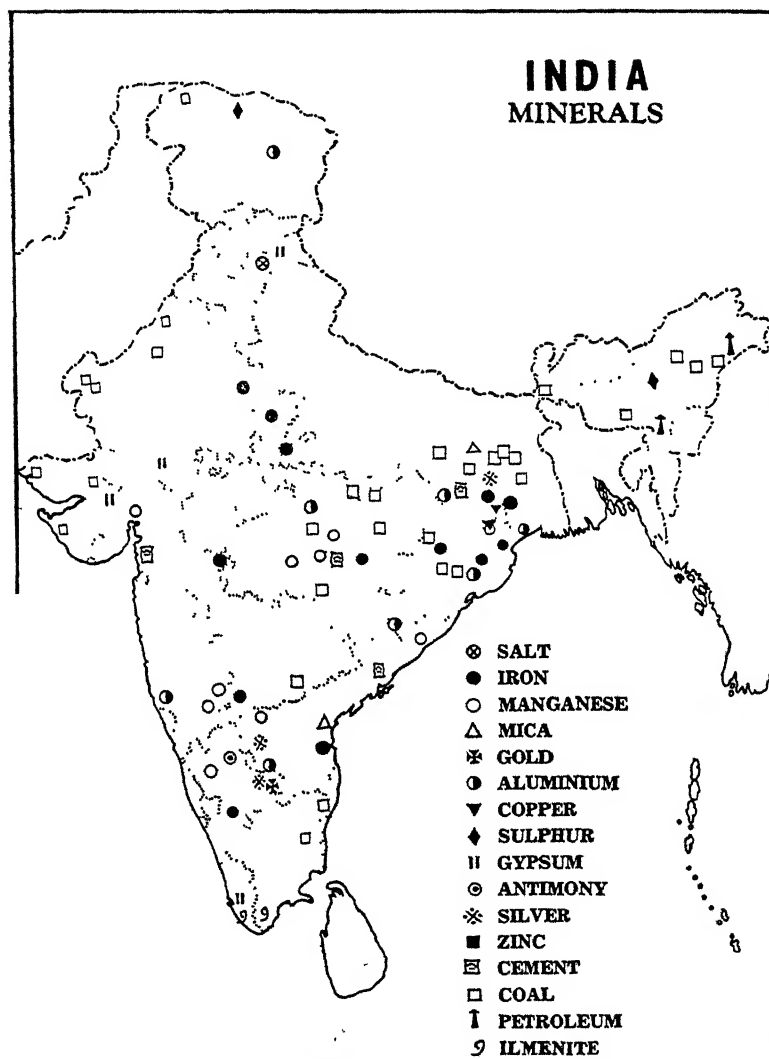
MINERAL PRODUCTS

India possesses valuable minerals, but the mineral resources of India are not adequate for a country of its size and population. While the country's mineral resources are fairly varied, she cannot be said to be self-sufficient in respect of all industrial and strategic minerals. The mineral resources of India may be divided into the following categories :—

India's position in the possession of mineral wealth is neither as enviable as that of the U.S.A., nor is it as much pitiable as that of Pakistan. In some of the essential minerals, such as iron ore and mica, she has exportable surplus, while in some others, *e.g.*, in manganese, bauxite, gypsum, monazite, silica, steatite, etc., she enjoys a comfortable position. But she is not self-sustaining in such useful minerals, as coal, rare earths, nitrates, phosphates, beryllium, etc. ; and what is worst is her absolute or large dependence on foreign imports for minerals like copper, silver, nickel, petroleum, sulphur, lead, zinc, tin, tungsten, graphite, potash, etc. Thus the overall picture is neither wholly assuring, nor largely depressing. So to strike balance between the two ends, care must be taken to carefully conserve and judiciously exploit these irreplaceable free gifts of nature, so that imprudent utilisation by the present generation may not leave India of to-morrow in an impoverished state.

The mineral resources of India are very unevenly distributed. The coal-fields are localised in Gondwana region (West Bengal, Bihar and Orissa), oil-fields in Assam and iron-ores are also mainly centred in one area, and other important minerals are scattered far and wide. This uneven distribution retards co-ordination of production and distribution. Absence of mineral information and well-defined state policy for conservation of mineral wealth

and for regulation and grant of mineral concessions, halting progress of scientific geological survey of the



Principal Minerals of India

country's mineral deposits and also absence of any modernised institution for imparting high grade technical

training in Mineral Engineering and Applied Geology—these are some of the principal defects that our mining industry had to suffer from till recently. “The Industrial Policy Resolution of the Government of India published on April 6, 1948, explicitly recognised minerals amongst industries whose location must be governed by economic factors of all-India import or which require considerable investment or a high degree of technical skill and must consequently be the subject of central regulation and control.”

Hitherto another remarkable feature of mining industry was that minerals were raised mainly for export but very little had been done to develop those minerals that are associated with metallurgical and chemical industries. This was the chief cause of the predominance of foreign imports in the Indian market. With the development of industries in India, the position has been much improved and internal demand for minerals has much increased. This has given stimulus to raising of minerals in recent years as will be evident from the following table :—

Minerals Production of India

Year	Gold (ounces)	Iron ore (000 tons)	Manganese (000 tons)	Mica (000 tons)	Copper ore (000 tons)	Building materials (value Rs. 000)
1947	.. 171,705	2,498	451	136,308	323,035	3,58,14
1948	.. 180,430	2,285	526	151,273	322,282	3,16,28
1949	.. 164,204	2,809	646	151,709	329,304	3,00,31
1950	.. 196,925	2,965	883	162,447	360,308	4,15,00
1951	.. 226,357	3,657	1,248	197,523	269,057	4,35,75

Of the minerals for which India has to depend largely or entirely on foreign imports, the country's deficiency in sulphur, lead, zinc, tin, nickel, petroleum, silver, tungsten and antimony is the most serious and considerable quantities have to be imported annually. With industrial development of the country internal demand for these

Imports.

minerals will be further increased, and unless the hitherto untapped deposits which are known to exist atleast in some of the minerals, are properly exploited, India will have to depend more increasingly on imports from foreign countries.

Minerals	Sources of Imports
Sulphur	U.S.A., Italy, Pakistan.
Lead	U.S.A., Australia, Mexico, Japan.
Nickel	Canada.
Tin	Malaya, Strait Settlements, Burma.
Zinc	Rhodesia, Australia, U.S.A., Holland.
Petroleum	Iran, Saudi Arabia, Bahrein Islands, Burma.
Silver	U.S.A., Mexico.
Copper	U.S.A., Canada, Rhodesia, Japan. Portuguese East Africa.

Export. Another remarkable feature of Indian mining industry is that many of the key metals and minerals are worked solely for the purpose of exports. This has been due to the industrial backwardness of the country and to the consequent low internal demand. But if this is allowed to continue for long, India will find herself deficient in many of the valuable minerals.

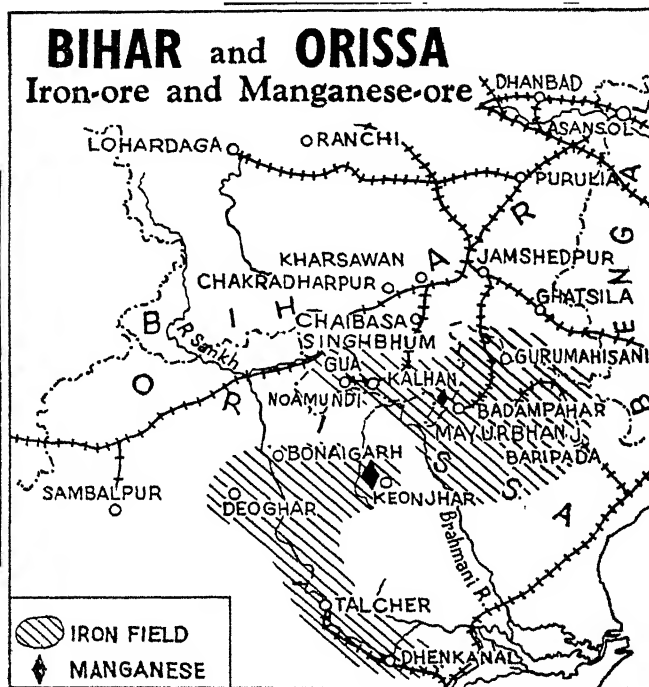
Minerals	Destination of exports
Manganese	U.K., France, Japan, Belgium, Norway, U.S.A.
Ilmenite	U.K., U.S.A. and Germany.
Chromite	U.K., U.S.A., Germany, Belgium, Sweden.
Magnesite	U.S.A., U.K., France, Belgium.
Mica	U.S.A., U.K., Germany, France.
Saltpetre	U.S.A., China, U.K., Straits Settlements.

Iron-ore. Iron.—India is the second largest iron-ore-producing country in the Commonwealth, ranks third so far as the world's estimated resources of iron ore are concerned and

occupies the ninth place in the list of iron ore-producing countries of the world. Her resources of high grade iron ore are perhaps the greatest in the world.

Extensive deposits of iron ore occur in several parts of India, namely, **West Bengal**, Bihar, Orissa, Madhya Pradesh, Mysore and Madras. Of these, the deposits in

Reserve
and actual
output.



the Singbhum district of Bihar and in the adjacent areas of Bonai, Keonjhar and Mayurbhanj are the most important, largest in extent and richest in iron content. The annual production of iron-ore in the Indian union is over 3 million tons. The major part of this output comes from Bihar, Orissa and Mysore. Bihar and Orissa raise the largest quantity of iron-ore.

Estimated Iron Reserve in different Regions

Area	Estimated Reserve	Percentage of iron content
Singbhum & Orissa	.. 8,000 million tons	65
Madhya Pradesh	.. 205 „	65
Mysore	.. 150 „	60
Madras	.. 305 „	40

There are four different kinds of iron ore in India, namely, magnetite, laterite, clay iron-stone and hematite. The most important of these, hematite deposits, are worked from the Singbhum and the Orissa fields, the "Iron Belt" of India. The other important hematite deposits are those found in the Lohara and Rayara Hills of C.P., the Bababudan Hills of Mysore and the Ramagarh and Dichabim regions of Kumaon.

Distribution of Iron ore in Indian Union

Bihar	Singbhum, Manbhum.
Orissa	Bonai, Keonjhar and Mayurbhanj.
Madhya Pradesh	Basta, Drug, Chanda, Jubbulpur.
Madras	Salem, Sandur, Trichinopoly.
Andhra	Kurnool.
West Bengal	Birbhum, Bankura, Burdwan, Darjeeling.
Bombay	Ratnagiri.
Mysore	Babubadan Hills.

Utilisation. India enjoys certain advantages for exploitation of her iron-ore deposits and development of her iron and steel industry. Most of her iron-fields are well-served by communication facilities and are found within easy reach of the coal mines. Two other minerals, namely, dolomite and limestone, which are necessary for smelting, are also available in the neighbouring areas. But India suffers from shortage of coking coal. This, coupled with the country's backwardness in iron and steel industry, account for large exportable surplus, of which U.S.A., U.K. and Japan are the principal buyers.

Manganese.—This is a very important industrial mineral, which has great demand in the heavy chemical,

electrical and glass industries and for hardening iron and steel. Its chief use is in the manufacture of steel. It is ^{Uses.} also extensively used in the making of dry cell batteries.

India is the second largest producer of this mineral—U.S.S.R. occupying the first place. India's reserves of manganese are estimated at 60 million tons. The mineral is widely distributed in the Deccan Plateau. The principal manganese-producing areas are Singbhum in Bihar, Panchmahal in Bombay, Balaghat, Bhandara, Chhindwara and Nagpur in Madhya Pradesh, Indore in Madhya Bharat, ^{Areas of mining.} Visakhapatnam in Andhra and Sandur in Madras, Shemoga in Mysore, Bonai, Keonjhar and Koraput in Orissa and Banswara in Rajasthan. The bulk of the output comes from Madhya Pradesh and Madras. Madhya Pradesh alone produces more than 60 per cent of the ore in India. India raises, on an average, one million tons of manganese ore annually.

The greater part of India's manganese ores are exported abroad. The principal importers are U.K., France, Japan, Belgium, Norway and the U.S.A. In recent years, with the development of indigenous iron and steel industry, there has been a steady increase in the consumption of manganese ores by Indian iron and steel companies. ^{Export.} Even then, about 90% of the total output is available for export, and, as such, the prosperity of the industry is dependant on world demand for this mineral and on India's ability to put it on the world market at competitive prices. In the interest of future needs of the country and in view of the limited resources, export of this valuable mineral should be controlled by the Government.

Till recently, the ports of Calcutta and Bombay handled the export trade of manganese ores. The largest producing state, Madhya Pradesh, had to pay high railway freight in sending her produce to these ports, and as such, second grade manganese ores were not raised as these could not be sold in foreign countries at competitive prices. With the opening of the port of Visakhapatnam and of the Waltair-Raipur railway line, connecting this port with the manganese ore-producing areas of Madhya Pradesh, the

industry has received great impetus and the country has been benefited as second grade manganese ore deposits are being exploited on profitable basis.

Mica.—India is the largest mica-producing country in the world and is responsible for three-quarters of the world's production.

Uses.

It is chiefly used in electrical industries, as a substitute for glass, in wireless telegraphy, and in aeronautical and automobile industries. Waste and scrap mica is ground and is used for wall-paper industry, manufacture of paints, rubber industry etc. Apart from these mica is also used in manufacturing roofing materials, ornamental tiles, lamp chimneys, etc. As it is an excellent insulating medium, it has become indispensable in electrical industries.

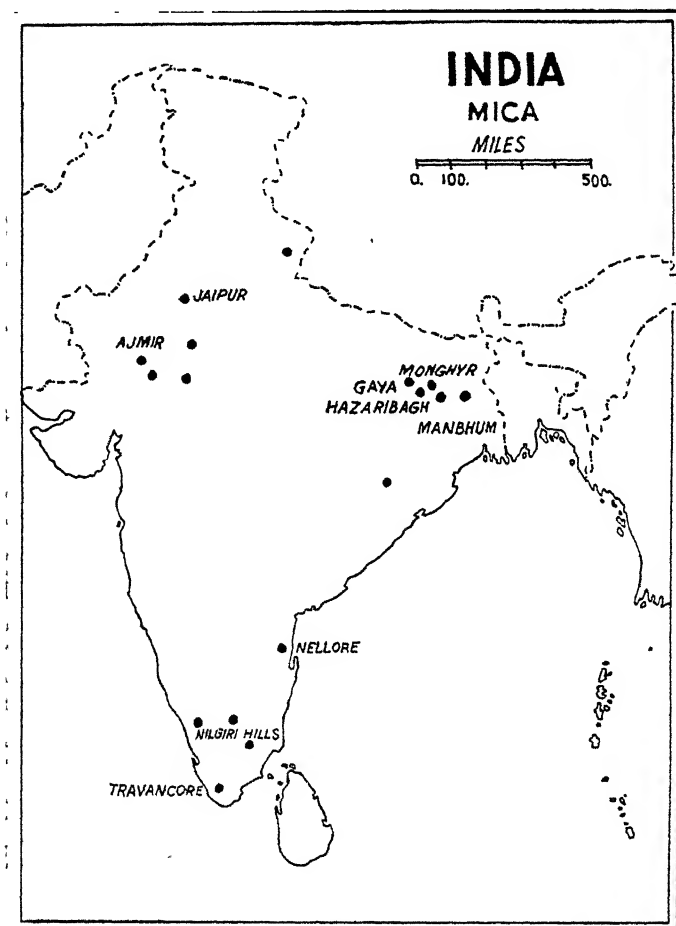
Areas of mining.

Mica is obtained from two principal areas—(1) The Bihar belt comprising the districts of Gaya, Monghyr, Manbhum and Hazaribagh and (2) the Nellore district of Madras. In addition small quantity of mica is available from Travancore, Mysore and Rajasthan. Bihar belt is the oldest and the most important, producing about 80 per cent of India's total output. Bihar mica is the finest in quality and enjoys great demand in the world markets.

The process of trimming and dressing crude mica involves much waste of this useful mineral. As there is no arrangement for utilising this waste mica, forming sometimes as much as four-fifths of the crude mineral mined, as fine powder, this is exported to U.S.A. at nominal prices, where it is turned to great use in electrical industries. This wastage must forthwith be stopped if greater benefit is to be derived from this mineral.

The internal consumption of mica in India is very small being only two or three hundred tons per annum. The bulk of the output is exported abroad. The average annual export of mica from India is 11,250 tons valued at Rs. 217 lakhs. More than 60 per cent goes to the United Kingdom, less than 20 per cent to the U.S.A. and the remaining quantity to Germany, France, Canada, Italy and

Japan. If India had a well-developed electrical industry of her own she could have turned a considerable quantity of mica to her own use.



India's Mica Production

The exports mainly go through the ports of Calcutta, Madras and Bombay Calcutta alone handling about 85 per cent of the total exports.

Brazilian mica is offering severe competition to Indian products in the international mica markets. Further

synthetic mica is also threatening to compete with natural mica. Development of electrical industries within the country will, in future, result in the increased demand for Indian mica and offer relief to the mica-producers of India.

Gold.—Gold occupies the third place in respect of value among the minerals of India, but India contributes only about 2 per cent of the world's production of gold.

Although it is found to occur in Hyderabad, Madras, Punjab, U.P. and Bihar, yet the production is practically restricted to the Kolar gold field of Mysore. This field in eastern Mysore, about 40 miles from Bangalore, raises over 99 per cent of India's total gold output. Power is provided from the falls of the Cauvery river at Sivasamudram, 92 miles distant. The field employs more than 23000 workers. Alluvial gold is found with sands in some of the rivers of India in Singbhum, Orissa, Ambala in the Punjab, Bijnour in U.P. and in the Brahmaputra valley in Assam.

In India gold is used for manufacturing jewelleries and for coinage. Local production is insufficient to meet internal demand and substantial quantity of gold is annually imported.

Uses.

Aluminium.—"Aluminium has rightly been called the 'wonder metal' of this age. Its amazing lightness, ductibility, malleability, its high degree of resistance to corrosive and chemical action, high electrical and thermal conductivity and its ability to form strength alloys in conjunction with other metals have led to its widest possible application in all departments of industry and civilised life during peace time as well as war." It is largely used as filtering material in petroleum refineries and for the manufacture of alum. High grade bauxite is used for producing aluminium.

India has vast deposits of good bauxite scattered all over the country. It is believed that the total known reserves of bauxite is 250 million tons, but, as yet, very little has been exploited. Attempts to extract aluminium

from Indian bauxite have proved successful only in recent years. In India, high grade bauxite deposits occur in Bihar, Bombay, Madhya Pradesh, Orissa, Madras and Kashmir. Madhya Pradesh is the largest producer of aluminium ores. The principal producing areas are Jubbulpore, Seoni, Nandgaon and Balaghat districts. Areas of mining.

Though India possesses vast deposits of bauxite annual output is quite small, as principal use of this mineral, namely, aluminium production is still in its infancy. Production of aluminium from bauxite depends upon availability of power, and it is expected that with the development of hydro-electric projects, power at cheap rate will be available for production of aluminium which, again, is in extensive demand for making aeroplanes and railway coaches.

Copper.—The copper is extensively used in electrical industries as it is very suitable as conducting medium. It is also in great demand for manufacturing telephone and telegraphic equipments, in ship-building industry and in the production of alloys. In India there is additional demand for copper for brass making and coinage. Uses.

India occupies the thirteenth place among the copper-producing countries of the world and her production is less than 1 per cent of the world's total output. Copper ores in India chiefly occur in Singbhum and Baragunda in Bihar. The copper belt in the district of Singbhum extends for about 80 miles comprising the important fields like Mosabani, Ghatsila and Dhobani. The bulk of India's output is raised from these fields. Here the mine is worked by Indian Copper Corporation. About 370,000 tons of copper ore are being mined annually in Singbhum. Areas of mining. Apart from Bihar, Orissa, Madras, Mysore, Rajputana, Nepal, Bhutan and Sikkim are the other important centres of production of copper ore. Deposits are also believed to occur in West Bengal, other parts of Bihar, Madhya Pradesh, in Garhwal and Almora districts of U.P. and in Jammu and Kashmir, but raising of ores has not been started in these areas.

Imports. India's production of copper ores meets only a fraction of her demands, and, as such, India has to import copper ores from overseas sources. Her annual imports are valued at about Rs. 625 lakhs. Imports come mainly from U.S.A., Canada, Rhodesia, Japan and Portuguese East Africa.

Internal utilization. With industrial development of the country, internal demand for copper ores will be further increased, and it is almost certain that even if the country's production is further accelerated, she will never attain self-sufficiency in copper. The prosperity of Indian copper industry is largely dependent on the success of Indian brass-making industry, and in recent years demand for brass-goods has considerably fallen due to introduction of alluminium products.

Uses. *Chromite*—It is used in making ferro-chrome, chromite steel and chromite-bricks. It is also used for electro-plating, for making furnace-refractories and for manufacturing chromium salt necessary for tanning and dyeing. Chromium is added in small quantity to improve the hardening qualities of steel. More than 10 per cent of chromium prevents rust. Stainless steel is used for manufacture of coins, surgical instruments, cutlery goods, heavy machines etc.

Mining areas. India has moderate reasources of chromite ore. The more important deposits are found in Singbhum and Bhagalpur in Bihar, Ratnagiri in Bombay, Salem and Krishna in Madras, Hassan, Kadur and Chitaldrug in Mysore, Keonjhar in Orissa and Ladakh in Kashmir. It is expected that some quantity of ore can also be found in Manipur State and the Andaman Islands.

The greater part of the output is exported outside. The principal buyers of Indian chromite are the U.K., Norway, Sweden, Germany and U.S.A., The export trade is handled by the ports of Calcutta and Madras.

Uses. *Sulphur*.—Sulphur is extensively used in chemical industry, for the manufacture of fertilizers, ammunitions:

and sulphuric acid. It is also used in rubber and lumbering industries.

India's position in sulphur is not bright. There are no known deposits of elemental sulphur in India. Only some amount of sulphur occurs in the form of pyrites. Deposits of pyrites occur in small quantities in Kashmir, Bihar, Bombay, Mysore and in the neighbourhood of Simla. Mining areas.

Assam coal is said to have a high sulphur-content. The Fuel Research Institute at Digwadih is reported to have found sulphuric content in Rewa coal.

India requires about 65,000 tons of sulphur annually. The demand will further increase with the increase in the production of chemical goods. Sulphur is also increasingly demanded for manufacturing processes of sugar, rayon, paper, rubber, photo chemicals, soda ash, matches and explosives. Indeed, the quantity of consumption of sulphuric acid by a country is regarded as the index of its industrial development. India has to import large quantity of sulphur from abroad. Imports come mainly from Pakistan, Italy and U.S.A. Import.

Gypsum.—Gypsum plays an important part in the industrial economy of India, next to coal and iron. It is used as raw material in the manufacture of cement and plaster of Paris. It is also used in the manufacture of sulphuric acid and chemical fertilisers. Uses.

Gypsum sources in India have been estimated at 85.5 million tons, lying in Bikaner and Jodhpur in Rajasthan, Trichinopoly in Madras and in Saurashtra and Himachal Pradesh. Large quantities of gypsum have recently been discovered in Jamsar in Rajasthan and Ran in Saurashtra. Small quantities also occur in Tehri-Garhwal. Output

At present India produces about 200,000 tons of gypsum. The Sindri Fertiliser Factory alone will require about 600,000 tons of gypsum annually.

Sources. **Salt.**—Salt is one of India's ancient industries. In undivided India salt was produced in two different ways—(1) by evaporating sea and lake water and (2) from beds of rock salt. It is an essential commodity. It is mainly used for preparing food and for preserving fish, meat, hides and skins, etc. Even in pre-partition period the country was not self-sufficient and had to import salt from abroad. This dependence was accentuated by the loss of extensive rock salt deposits in West Punjab and the marine salt works of Sind as a result of partition. But by the beginning of 1951, Indian Union claimed to have attained self-sufficiency and, at present, some amount of salt is exported, primarily to Pakistan.

Producing areas. About 75% of the total output is obtained by the solar evaporation process. Salt is produced by this process on almost all the coasts of India. The principal salt-producing areas are located in Saurashtra, Madras, Bombay, Rajasthan, Kutch, Travancore-Cochin and Orissa. Rock salt is obtained only at Mandi in Himachal Pradesh. Madras contributes more than 30% of India's production. More than 80% of this production is consumed locally and the balance goes to Madhya Pradesh, West Bengal, Orissa and Mysore. In West Bengal a few small-scale factories and cottage workers in the coastal districts produce salt from sea-water. West Bengal has to import huge quantity of salt annually and these imports mainly come from Aden and Red Sea ports, Madras and the West Coast of India. This State possesses great potentialities for increasing her production of salt by the establishment of large factories along the Sunderbans and the Contai sea-board of Midnapore.

Since the out-break of the Second World War production of salt has been gradually increasing and India's dependence on imports has been declining. This improvement has been possible because of the development of local production of salt. Besides the existing model farm and Salt Research Station at Wadala in Bombay, a Central Salt Research Station was established in 1952 at Bhavnagar

in Saurashtra under the control of the Council of Scientific and Industrial Research.

Asbestos is fibrous mineral, considered valuable for its heat and electricity-resisting properties. It is chiefly used in the manufacture of fire-resisting materials.

India produces only a small quantity of asbestos and has to import large quantities annually. Small quantities of asbestos are raised in Mysore, Ajmer-Marwara, Rajasthan and in Singbhum district of Bihar and Cuddapah district of Madras.

Antimony is a useful, silvery, white alloy for mixing with softer metals like tin, copper and lead. It has varied uses and is in demand for the manufacture of paints and dyes, lead sheets, type metals, storage batteries, lead pipes, table-ware, ammunition and is also used in the manufacture of matches.

India's present production of antimony is not quite considerable, but she possesses great possibilities for the development of this industry. Deposits of this mineral are reported to occur in Madhya Pradesh and Mysore.

Monazite is a strategically important mineral as it is regarded as a source of atomic energy.

Indian Union is the largest producer of monazite. It is available on the beach sands of Travancore-Cochin in association with ilmenite. It is perhaps the richest in thorium in the world and it also contains a small quantity of uranium. Previously the total output of about 4,000 tons was exported, but, in order to conserve supplies for atomic energy development, exports are now prohibited under the Atomic Energy Act of 1948. About 88% of this mineral is supplied from India.

Tungsten (Wolfram) is used in the manufacture of hard steel and electric bulbs. It occurs in a few localities in West Bengal, Bihar, Madhya Pradesh, Madras and Rajasthan.

Graphite is used in the manufacture of polishes and paints and lubricating materials and in the making of lead pencils.

Deposits of graphite occur in small quantities in various parts of India, namely, Ajmer, Hyderabad, Madras, Mysore, Madhya Pradesh, Orissa and Travancore. During recent years deposits have been worked in Madhya Pradesh, Mysore and Orissa only. India produces about 600 tons of graphite annually.

Silver is used in the manufacture of ornaments and utensils and for coinage. India is the greatest consumer of silver in the world but her production is quite insignificant.

Silver is obtained in combination with other minerals like gold, lead and copper. The Kolar gold fields in Mysore produce the bulk of the Indian output. Other important producing areas are Hyderabad, Rajasthan, Manbhum and Singbhum in Bihar and Anantpur in Madras.

Local production of silver is insufficient to meet internal demand and India imports large quantity of silver from U.K., U.S.A., Belgium, Mexico and Western Germany.

Tin is used in making bronze and in cooling iron sheets as a protection against rusting.

Some deposits of this mineral occur in the Hazaribagh district of Bihar. Imports from Burma and Malaya go to meet the total requirement of the country.

Ilmenite.—In recent years there has been a rapid rise in the production of ilmenite. India has now become the world's leading producer of this metal. "It is the whitest of all substances and will replace lead more and more in the manufacture of white pigment." The mineral occurs in the "Black Sand" of the beaches near Cape Comorin and Bombay.

Zinc.—India's resources of this mineral are poor. The only important source of zinc ore is the Zowar mines in Jodhpur.

Zircon yields zirconia which is a high grade refractory and an alloy material. It is used as an abrasive and also in the preparation of ferro-zirconium for making a special kind of steel. It is available on the beach sands of Travancore and Cape Comorin. Uses and
Production.

Cement—The principal cement-producing areas are Porbandar in Kathiawar, Katni in M.P., Lakheri in Rajasthan, Jubbulpur in M.P., etc. Production.

Vanadium is a valuable metal yielding special steels of great strength, toughness and durability. Vanadium bearing titaniferous iron ores exists in Singbhum and Mayurbhanj. Uses
and
production.

Steatite is also known as soap-stone and in its powdered form as "french chalk". It is one of the most variously used minerals. It is extensively used in paint, paper, rubber, leather, glass, soap, toilet, textile, disinfectant industries. Uses and
production.

Large deposits of this mineral occur in India. It is available in Madras, Madhya Pradesh, Orissa, Rajasthan, Hyderabad and Kashmir.

Sillimanite is used in the manufacture of furnace lining in the iron and steel, glass and ceramic industry. Uses and
production.

This mineral of rare occurrence is almost a monopoly of India. Deposits of sillimanite are reported to exist in Assam, Madhya Pradesh and Rewa.

China Clay occurs in small quantities in various parts of India, namely, Ajmer, Hyderabad, Madras, Mysore, Orissa and Travancore. In recent years only the deposits in M.P., Mysore and Orissa have been worked. Production.

Kyanite—India is the principal producer of kyanite. It is used in the refractory and ceramic industries. Deposits of kyanite occur in Seraikela and Kharsawan in Singbhum district in Bihar, in Mayurbhanj district in Orissa, in Nellore district in Madras and in the Hassan district of Mysore. Uses and
production.

Uses and production. *Beryl* is a strategic mineral, used in the manufacture of shells etc. It is generally found in combination with mica. India has been a large producer of beryl chiefly from the mica mines of Bihar and Rajasthan.

Production. *Precious stones*—Of the precious stones, diamond industry is the oldest. Diamonds are very highly valued and are mostly used in jewelleryes and ornaments.

India's output of diamond is quite insignificant. Actual diamond mines occur in the State of Panna in Central India.

Sapphires of a very clear blue colour are obtained in Kashmir.

Garnets of a rich, deep, purplish red colour are obtained in Kishengarh State and in the adjoining areas of Jaipur State.

Power Resources

Industrial power resources in India. Cheap power is needed for domestic purpose, for agricultural improvement and industrial development. Indeed, the pace of industrial progress has been much accelerated by the availability of cheap motive power.

In India the principal sources of power are (1) Coal, (2) Woodfuel, (3) Petroleum and (4) Hydro-electricity. Coal is, no doubt, the main source of industrial power, but in regions far away from the coal fields, difficulties of transportation are experienced and coal costs much. Further, coal and petroleum as means of generating power are exhaustible, but water is inexhaustible. The use of water would obviate the difficulties involved in transporting coal and would release coal for use in other purposes of national importance.

Coal justifies the name 'black diamond', and in fact it is much more precious than diamond itself, since it contains treasures still uncounted, among the great assets of the future. It provides the motive force of the industrial world today. To get the coke to make a ton of pig iron to make

steel, it is necessary to use atleast $1\frac{1}{2}$ tons of coal. In addition to coke, by-products like gas, coal tar, light oils and ammonia are obtained. Again from coal tar are obtained such products as road tars, cresote oil, pitch, naphthalene, carbolic acid and even the sulphur drugs. Chemists have derived from coal tar such unbelievable things as beautiful dyes, perfumes to compete with nature, disinfectants, insecticides, aspirin, atabrine, laxatives, sedatives, certain vitamins, and even butter and oil. From the light oils are derived Benzol and Toluol. An important by-product of coke oven is Ammonia which produces Ammonium Sulphate, one of the most important fertilisers.

The situation of India with regard to the sources of power is not quite favourable. Indian coal is of inferior quality and is not evenly distributed throughout the country. Indian forests are situated in the inaccessible tracts and transportation of wood fuel is difficult and expensive. Petroleum resources of India are meagre and are on the decline. Development of water-wealth of the country has not been at all satisfactory.

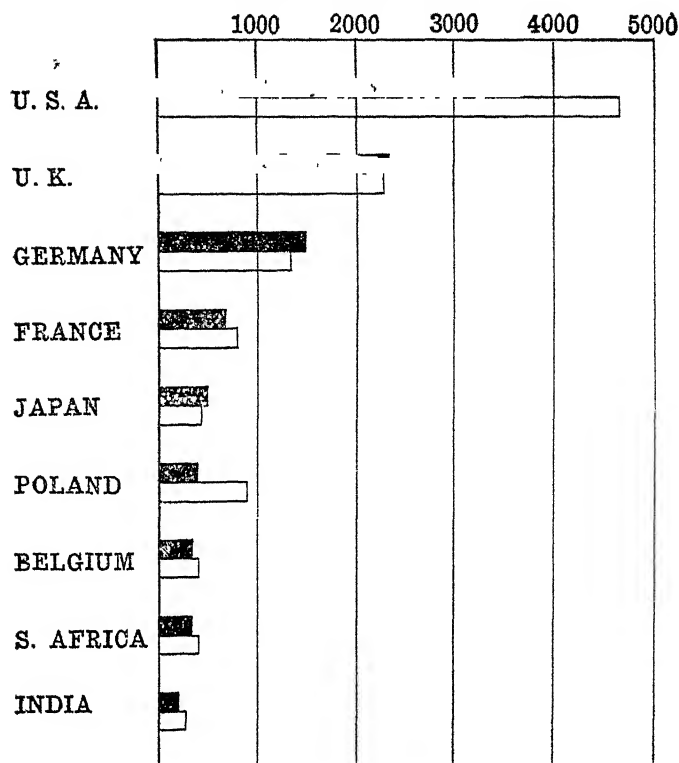
India lags far behind other civilised countries in the production and consumption of electricity. In 1952, 6200 million kilowatts of electricity were generated. On this basis, per capita consumption of electricity in India is about 2 units at the most.

The history of coal in India begins almost with the beginning of British rule in this country. In 1774 two officers were deputed by Warren Hastings to find out coal in this country, and one of them, Mr. S. G. Heatley, discovered the existence of coal in Birbhum. Almost seventy years later, in 1843, the first regular colliery started working under the name and style of Bengal Coal Co. under the management of Messrs. Andrew Yule & Co.

Coal is the most important mineral product of India. With the exception of the United Kingdom, India is the largest producer of coal among the Commonwealth countries. ^{Raising of} Coal.

Coal Production of different Countries of the World

(In '00000 metric tons)



Raising of Coal in Indian Union

(in 000 tons)

Year	Annually raised	Year	Annually raised
1948	30,607	1951	34,984
1949	32,204	1952	36,885
1950	32,825	1953	36,301

It is noticeable from the above table that there has been considerable increase in the raising of coal in recent years. In the pre-war period of 1938-39, 28 million tons were raised. The partition of the country has not affected Indian Union's position with regard to supply of coal, as most of the coal resources happen in Indian Union.

The Indian coal fields are classified according to two geological divisions, namely, the Gondwana Coalfields and the Tertiary Coalfields, the bulk of the coalfields belonging to the former class. More than 90 per cent of the total coal output of India comes from the Gondwana coalfields. Gondwana coal is mainly found in West Bengal, Bihar, Orissa, Madhya Bharat, Madhya Pradesh, Hyderabad and Rajasthan. Tertiary coal deposits occur in Assam and Kashmir.

Total coal reserves of different varieties are estimated at 60,000 million tons, distributed as follows :—

Coal
reserves.

Million tons

1. Darjeeling and Eastern Himalayan Region	100
2. Giridih, Deoghar and Rajmahal Hills	250
3. Ramgunj, Jharia, Bokaro, Karanpur fields	25,650
4. Sone Valley	10,000
5. Chattisgarh and Mahanadi	5,000
6. Satpura Region	1,000
7. Wardha Valley	18,000
	<hr/>
	60,000

The coal found, broadly, speaking, is of four types :—
peat, lignite, bituminous and anthracite. Of the total output Bihar accounts for 55 per cent., West Bengal 28 per cent., M.P. 6 per cent. and Hyderabad 4 per cent.

Types of
coal.

Indian railways consume the largest amount of coal in India.

Analysis of Coal Consumption (1952)

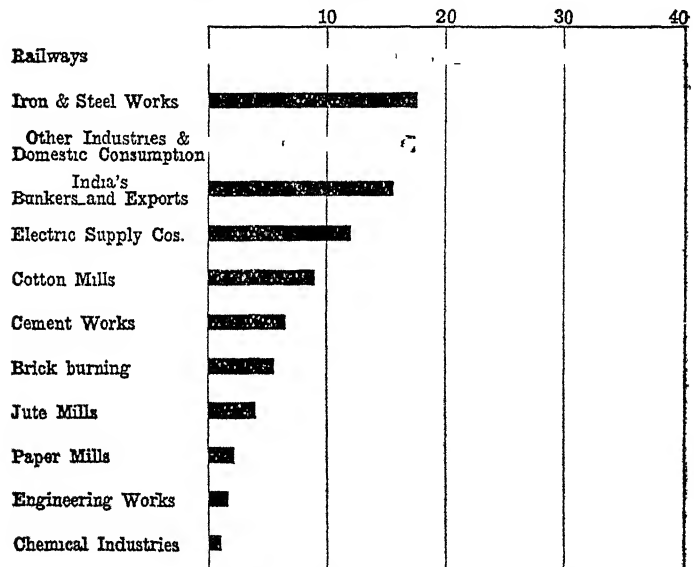
Consump-
tion of coal.

Railways	..	..	31	per cent
Iron and Steel Works	..	..	12	"
Electric Supply Companies	..	..	7	"
Cotton Mills	..	..	5	"
Brick burning	..	..	3	"
Cement works	..	..	4	"
Jute Mills	..	..	1.5	"
Paper Mills	..	..	1.5	"
Engineering workshops	..	..	1.4	"
Chemical Industries	..	..	1	"
Indian Bunker's and Exports	..	..	9.6	"
Collieries	..	..	11	"
Other industries and Domestic consumption	..	..	12	"
			<hr/>	
			100	"

Coalfield.
in India.

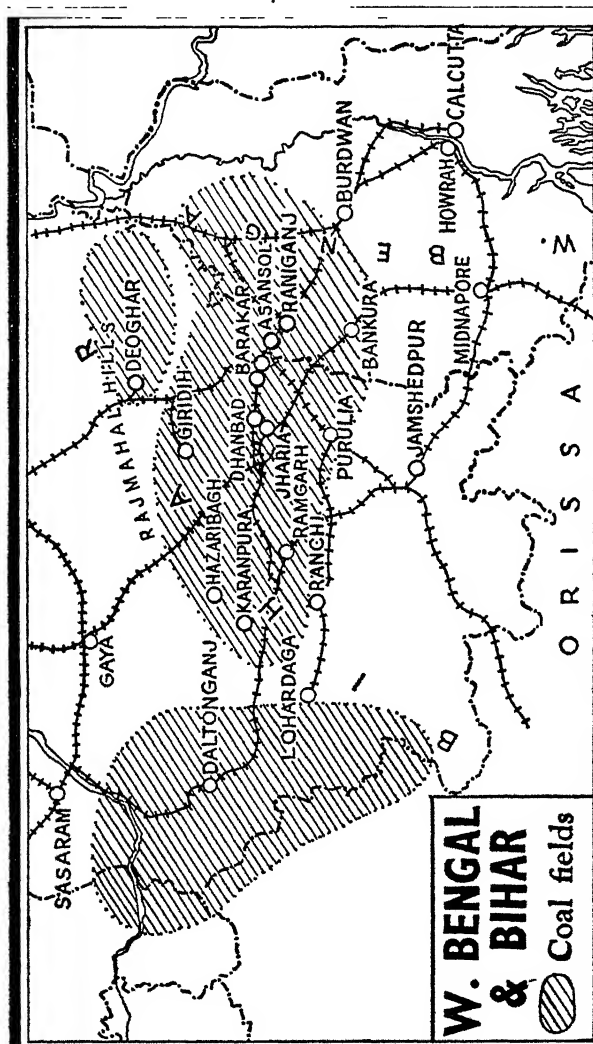
Bihar is the largest producer of coal in India. Principal coal fields have been developed at Jharia, Bokaro, Karanpura, Giridih, Palamau, Ramgarh and Daltonganj, West Bengal ranks second in the production of coal. In West Bengal coal fields are found around Raniganj and Asansol. The coal in Orissa is found along the Mahanadi Valley. The important fields are located at Talcher, Rampur and Hingir. The quality of coal of Madhya Pradesh is not

Industry-wise Consumption of Coal in India



very high. The fields are located at Chattisgarh, Tatapani, Ramkola, Jhilimili, Jhakrakand, Kurasia, Bistrampur, Korbe and Raigarh. High quality coal is found in Hyderabad. The coal fields are found in the valleys of Pranhitia and Godavari. Tertiary coal fields of Assam are found in Garo, Khasi and Jaintia hills. In Kashmir low grade tertiary coal is found in Jammu. In recent times, deposits of lignite coal have been discovered in Arcot district of Madras.

Total quantity of coal raised in the Indian Republic in 1952 was 36,301,865 tons of which Raniganj and Jharia fields alone accounted for 23,577,469 tons.



Raising of Coal in different Important fields

Field	(1952)			Tons
Jharia	13,303,184
Raniganj	10,274,285
Bokaro	2,485,947
Karanpura	1,014,740
Madhya Pradesh	3,449,077
Hyderabad	1,434,194

Coal in India is very unevenly distributed. The major coal fields are located in the north eastern part of the country. In the Peninsular India it is found only in a small quantity. The Indian coal fields are neither in the coasts nor in the vicinity of industrial areas. This uneven distribution of coal, coupled with the high cost of railway transport, acts as a great handicap to the successful development of industries. Another defect of Indian coal lies in the fact that it is generally poor in quality. There are also some great drawbacks in the coal mining industry of India. Method of raising coal is not economic and up-to-date sand-stowing process is not adopted for the preservation of coal resources. High grade coal is used in running the locomotives. The coal-mining industry has not been developed in an organised way. The means of transport have not been fully developed connecting the different mining areas with the areas of consumption. In the economic interest of the country India's coal-mining industry should be rationalised in no time.

The Planning Commission has made the following recommendations :—

(i) The production of metallurgical coking coal may be maintained at the present level, but mines producing coking coal should be closed if they can be reopened without large capital outlay.

(ii) Stowing, blending and wasting should be enforced by law,

(iii) Selective mining should be effectively stopped,

(iv) Coking coal should be replaced by other types of coal where the use of coking coal is not necessary, and

(v) Coking coal mined in excess of the quantities needed for the iron and steel industry, may be exported to other countries in order to earn foreign exchange.

The development plan suggests that a geological map showing the distribution of coal fields should be prepared to get an idea about the coal resources of the country.

Scientific classification of Indian coals should be made on the basis of caloric value, ash content, moisture and coking property. Coal fields should be properly linked up with the consuming areas. The Fuel Research Institute should undertake research on the carbonisation and production of coke, the design of coke ovens, wasting and blending of coal and the desulphurisation of coal. It may be mentioned in this connection that a Fuel Research Institute at Digwadih, near Jharia, has been started in 1949. The function of the Institute is to make survey of Indian coals and to carry out researches on processing with a view to manufacturing metallurgical coke and investigation on low-temperature carbonisation and tar distillation for dyes, drugs, plastics and explosive and synthetic liquid fuels.

The Government of India have appointed a Coal Board to deal with all problems relating to coal from a comprehensive point of view. It has enforced the stowing, blending and wasting of coking coal. The Coal Board is also taking steps to bring about mechanisation of the industry.

Another problem that seriously confronts our coal-mining industry is the rapid exhaustion of our coal resources. Unless a carefully drawn plan of coal conservation is adopted without any delay, our limited resources of this valuable source of power are likely to be exhausted, at the present rate of consumption, within 60 to 65 years. Use of low-grade coal by collieries, railways and certain industries, electrification of railways, coal wasting and coal blending are some of the suggestions to effect coal conservation.

In pre-war years India used to export some quantity of coal and Ceylon, Straits Settlements, Penang and Aden were the customers of Indian coal. In the post-war period, particularly after the division of the country, export of coal from India has increased. Pakistan, Japan, Australia Hongkong, Ceylon and Burma are the principal buyers of Indian coal. Pakistan and Japan are the biggest purchasers of Indian coal at the moment. During 1952 Pakistan purchased 1,143,832 tons and Japan 765,767 tons. Burma,

Ceylon, Hongkong and Australia each purchased more than 200,000 tons and Korea 101,296 tons. The export trade is handled by the port of Calcutta.

Products and uses. *Petroleum* is the last of the five minerals of India in terms of value. It is a valuable source of power and plays an important part in the industrial development of a country. Petrol, fuel oil, Kerosene and lubricants are some of the products of this mineral and these are used in steamships, railroads, manufacturing industries and for domestic purposes.

Mining areas. The position of India in respect of Petroleum is not quite satisfactory. India contributes only 1·10 per cent. of the world production and almost the whole of her requirement is met by the import of finished products. The production of petroleum is carried on in the north eastern part of India in Assam in the Lakhimpur district. Digboi is the principal oil-mining centre. The other producing centres are Bappapung and Hansapung. The oil producing region covers an area of about 2½ sq. miles.

Imports. India requires more than 300 million gallons of petrol, but she produces only 100 million gallons of crude oil. Therefore a large amount of petroleum has to be imported annually. Imports come mainly from Iran, Bahrein Island, Saudi Arabia, U.S.A., Burma, Sumatra and Singapore. About 74 per cent of India's requirements of petrol comes from Iran.

Development plan. But the future of India's oil-mining industry is not very dark. India can manufacture large amount of synthetic oil from sugar-cane and oil seeds. India's position in respect of lignite coal is also very satisfactory. So synthetic oil may also be prepared from coal.

Oil refining in India dates back to 1920 when Assam Oil Company established India's oil refinery to refine crude oil from Assam fields. The recent setting up of three new giant refineries is expected to give great impetus to oil refining industry, and the three refineries will, when they

will be under full production, yield over 90 per cent. of India's petroleum requirements.

The Government of India have entered into agreements with the Burma-Shell, Stanvac (Standard Vacuum Oil Company) and Caltex for building up refineries in Trombay Island, Bombay, which will have a crude oil intake of 3·7 million tons per year. The Stanvac Oil Refinery started their operation on 19th November, 1954. This refinery will have a capacity of 1·2 million tons per year ; while the other two, viz., the Burma-Shell, the largest of its kind in Asia, and Caltex will have an intake capacity of 2 and 5 million tons respectively. Motor spirit, kerosene, diesel oils, furnace oil, bitumen, wax, etc. will be the products of these refineries. The refineries, involving capital investment of Rs. 50 to 60 crores will have far reaching effect and will go a great way in meeting the country's demand for this essential material.

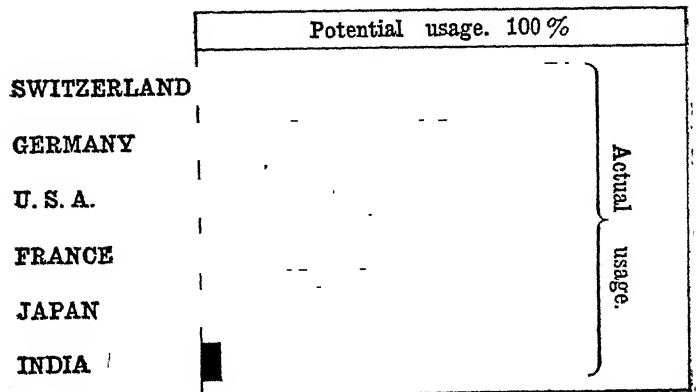
It is expected that if proper prospecting is carried on, oil reserves can be found along the Himalayan area. Moreover, there is every possibility of getting oil supply from the coastal regions of West Bengal, Cutch, Saurashtra, Kathiwar and in the Kangra Valley in East Punjab. Investigation is already being carried on for tracing oil reserves in the coastal regions of West Bengal.

Hydro-electric Power—India does not possess adequate supplies of coal and oil fuels. Moreover, Indian coal is of poor quality and is unevenly distributed. But there is immense possibility of harnessing water-power in India. It has been roughly calculated that only about 6 per cent of available water-wealth in our rivers is being utilised and the balance of 94 per cent. is running to waste, causing incalculable damage to life and property through uncontrolled floods, stagnating pools, and malaria mosquitoes.

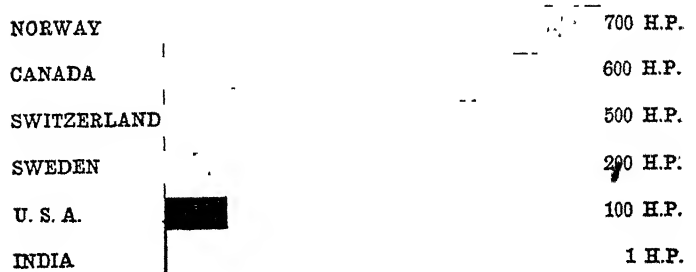
Water power is a valuable natural resource in India. Heavy rainfall, rugged surface features to cause water to fall and regular and continuous flow of water are the three essential requirements for the generation of hydro-electricity. Favourable geographical conditions.

city. In the hilly areas and in the Deccan plateau generation of hydro-electricity has extensive possibilities. But the seasonal nature of rainfall in India causes much difficulty and necessitates construction of costly storage works. This enhances the cost per unit of electricity generated. It is evident from a comparison of the position of India with other countries of the world, that the development

**Actual use by different countries of their
potential water-power**



**Per Capita use of Electrical energy by
different countries**



of hydro-electricity in India is very unsatisfactory. While India is capable of producing 40 million K. W. as against 43 million by Canada and 35 million by the U.S.A., the actual production of electricity in this country is less than a million.

With great strides made in the direction of taming the turbulent rivers of India to yield electricity to light cities, work factories and run trains, India now promises to be one of the leading countries of the world in the development of hydro-electric power. Her potentialities for hydro-electric development is estimated at 40 million horse power out of the world total of 300 millions. "An unwholesome feature of the poor progress made in India is that most of the installations have been planned to satisfy the demands of urban areas. This is best illustrated by the fact that Calcutta and Bombay, with a total population of one per cent. of the whole country between them, consume 50 per cent. of the total energy produced in India, leaving the other 50% per cent. for the remaining 99 per cent. of the population."

When the hydro-electric projects now under construction or awaiting construction are completed, India's resources of developed water-power will probably rank as the third largest in the world, next only to those of the U.S.A. and Russia.

The first major hydro-electric installation was set up in the east of the Cauvery river at Sivasamudram in Mysore State in 1902 with the object of supplying power to the Kolar gold fields. Since then extensions and improvements have taken place and power is transmitted to Bangalore and many other towns of Mysore. The Tata Hydro-Electric Power Supply Co. was established in 1910 to supply electricity to Bombay. There are three power houses at Khopuli, Bhivpuri and Bhira. The Khopuli power station was completed in 1914 and the Andhra Valley Power Company's station at Bhivpuri was finished in 1922. The textile mills of Bombay have been much benefited by these hydro-electric undertakings, specially because coal is not available in the neighbourhood. The Pykara Hydro-Electric Works was completed in 1933. The Pykara river is one of the largest of the rivers draining the plateau of the Nilgiris. Its source is situated at an altitude of about 7000 ft. on the slopes of the Mukurti Peak about 12 miles

Major
Hydro-
Electric
Installations.

west of Ootacamund. The energy generated in this station is consumed in the textile, cement, tea and other cottage industries. Power is transmitted to Coimbatore and is passed on to Tiruppur and Jhena and to Erode from where it is transmitted to Trichinopoly. Another important hydro-electric installation in Madras is at Mettur Dam. The Mettur Lake has the largest capacity in India and the water is used both for irrigational and power purposes. It supplies power to Salem, Trichinopoly, Tanjore, North Arcot, South Arcot, etc. and is linked with the Pykara Works. The other important schemes in Madras are the Pariyar, the Papanasam and the Pallivasal projects.

Outside Peninsular India the oldest major electric installation is at Baramullah in Kashmir, started in 1908. This is also known as the Jhelum Power Works and supplies energy to Srinagar. The Uhl River Electric Works, also known as the Mandi Scheme, is the principal water power enterprise carried out by the Punjab Government. The head-works and the generating stations are in the Mandi State near Simla. The place is called Jogindur Nagar. In Uttar Pradesh all the Ganges Canal installations are interlinked and supply power to the U.P. Grid which is spread over 11,000 square miles extending from Hardwar in the north and Agra in the south and from Chapprauli in the west and Moradabad in the east. The main power house is at Bahadurabad. The development of hydro-electric schemes in the eastern part of Northern India is much less marked than the western zone. This area is rich in coal and mineral oil. So we find that West Bengal and Assam, inspite of having advantage for the development of hydro-electricity, lag behind in the matter. All round the two Assam Valleys are high mountains and thousands of horse powers of potential hydro-electricity pour down these hills and mountains into the Brahmaputra, the Surma and the Barak, but they are not being exploited.

The rivers of Northern India are perennial. They also flow through the steep slopes of the Himalayas. There-

fore, the rapids and falls and the rivers can be efficiently utilised for the generation of hydel power. The rivers of Southern India pass through rugged mountain territories. They are also not suitable for navigation. So the rapids and falls can be utilised for the generation of power. Storage of water is possible by constructing dams and barrages across the rivers.

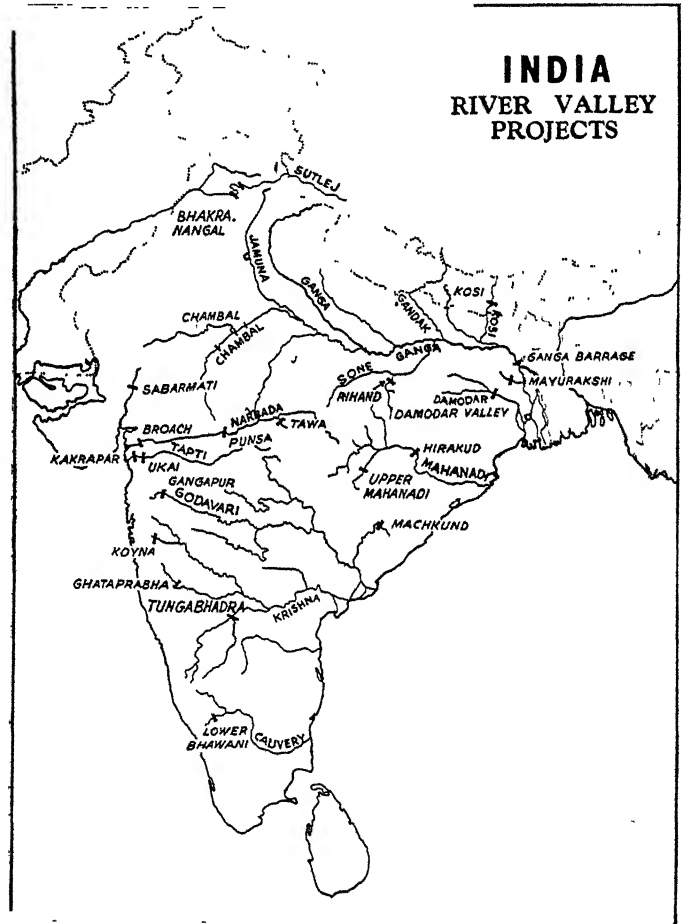
Multipurpose Projects—It is increasingly being realised that while a project conceived for a single purpose like irrigation or flood control, might not be an economic proposition, it might become a financially feasible and productive scheme, if it included other purposes like navigation, generation of power, etc. So, the multi-purpose schemes have come in, because of the manifold benefits they yield. Apart from providing irrigation facilities for growing additional food and commercial crops, two other main benefits are the control of floods which cause enormous destruction of crop, property, cattle and human life every year, and the generation of large blocks of hydro-electric power. Among the other benefits which accrue from the projects are the development of internal navigation which relieves the pressure on the railways, soil conservation, afforestation, pisciculture, construction of townships, and provision of drinking water. The importance of these projects can be realised from the fact that high priority has been assigned to them in the first Five Year Plan. Nearly a third of the total budget for the plan has been earmarked for river valley projects.

Multi-
purpose
projects.

Benefits.

Industry to flourish and have firm foundation must be situated close to an area where the essential raw materials, cheap power, cheap labour and facility of transport may be easily available. It is most interesting and exciting to note that most of the regions, where multi-purpose river valley schemes have been projected, have rich forest reserves, also most of India's mineral deposits and other raw materials. Thus these multi-purpose river valley projects offer almost unlimited and ideal opportunities for industries to be developed, which have been conceived in recent years.

Of the 153 projects now under construction in different parts of the country, six are multi-purpose, 104 irrigation and 43 power projects. Twelve of these 153 projects may be termed 'major'. In addition to these, there are 122 other projects on which preliminary investigations are either in progress or have been completed. These 122 schemes are estimated to cost Rs. 1310 crores.



Some of these projects are among the biggest in the world. When completed India will have the highest straight

gravity dam at Bhakra and the longest multi-purpose earth dam at Hirakud (15,784 ft.).

Power Projects included in the First Five Year Plan

Project	Total Expenses (in lakhs)	Energy to be generated (in 1000 k w)
Bhakra Nangal ..	132,90	400
Damodar Valley ..	74,89	274
Hirakud Dam ..	62,59	259
Kakrapara ..	12,16	24
Pykara 3rd Stage Extension	4,89	28
Machkund Hydel Scheme	6,82	103
Tungabhadra Hydel Scheme	7,94	60

Principal River Valley Projects

(1) *Damodar Valley Project*—The principal object of this multi-purpose scheme is to tame and harness the notoriously turbulent river, the Damodar, that leaves behind a trail of destruction and misery in almost every monsoon season, for the improvement of agriculture, industry, economic condition and public health of this river valley.

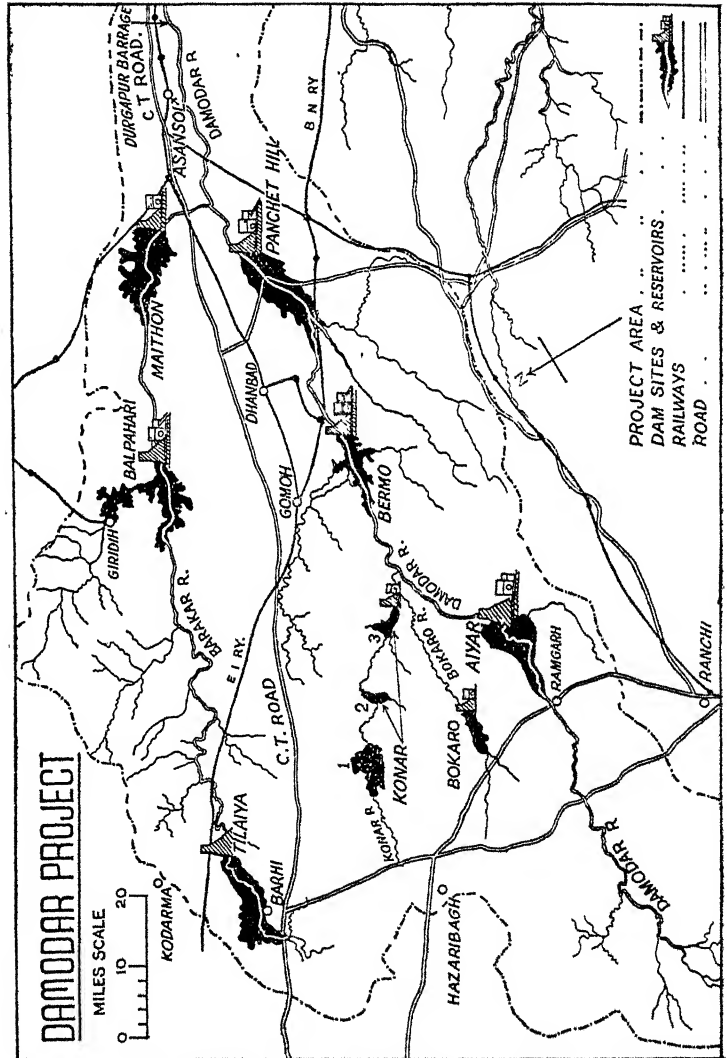
The 336 miles long Damodar, the River of Sorrows, rises from the Hills of Chotonagpur and after flowing for 190 miles in Bihar, enters West Bengal near Barakar, and ultimately joins the Hooghly. The upper valley of the river lies in Bihar where “torrential rains crash down upon the deforested hills, and the unimpeded rain water tumbles down the hills into the river”, and the lower valley lies in West Bengal where the “flooded Damodar overflows its banks, destroys crops and dwellings, carries away men and cattle, disrupts communications and dislocates temporarily the economic life of the valley.”

Few areas in the world have been blessed with such rich and varied mineral deposits as the *Damodar region*. Three quarters of our known coal deposits are located in

Damodar—
the River
of Sorrows

Resources
in the
Damodar
Basin.

this valley ; in and around it are concentrated the exceptionally good iron ores of India ; much of world's best mica is produced in this area ; there are substantial



deposits of bauxite, kyanite, chromite, copper, limestone, clay, also some manganese. Minerals of high strategic

value have recently been located here. The industrial importance of this region, even at present, will be clearly evident from a comparison of the minerals now extracted in the Damodar Valley area and the total production of minerals in India. The scheme, on completion, would give a fillip to rapid industrialisation of the area. Expected benefits

The scheme, when completed, will irrigate about 1 million acres of land and also it will generate about 240,000 K.W. of hydro-electricity. The districts of Bankura, Burdwan, Hooghly and Howrah in W. Bengal will enjoy the major irrigational facilities, while greater portion of the hydro-electricity generated will be available to Bihar. As the flood water and the annual flow will be converted into perennial flow, there will be better navigational facilities in W. Bengal and Bihar. In addition, general improvement, like afforestation, supply of water to urban areas and industries, fish culture, malaria control, and recreational facilities, etc. will also take place. The project would control disastrous floods and soil-erosion, it would bring large areas under cultivation and would thus increase food supply. This is expected to introduce a new era of economic prosperity for W. Bengal and Bihar.

The project as a whole envisages the construction of eight dams and a barrage. Of these eight dams, three will be located across the Damodar at Aiyar, Burmo and Panchet Hill, and another three across the Barakar at Maithon, Tilaiya and Belpahari and one each across the Konar and the Bokaro. The barrage will be constructed at Durgapur. The Project.

The Tilaiya Dam in the Upper reaches of Barakar river was inaugurated on Feb. 21, 1952 and the Dam on Konar is nearing completion. The work on Maithon Dam is in rapid progress. The proposed 38 feet high barrage will divert the water of Damodar into a 85 mile navigation-cum-irrigation cannal connecting Hooghly on the left side and 121 miles of the main canal. Included in the barrage project are many miles of drainage channels which are

designed to render certain swampy areas in the lower valley arable.

An Autonomous Corporation, The Damodar Valley Corporation, has been set up by an Act of the Government of India to implement and administer the scheme.

More
project
Its utility.

(2) *Mayurakshi Reservoir Project* or The More Project is the biggest project in West Bengal. The project, on completion, will control the flow of the river Mayurakshi and of its tributaries, the Brahmani, Dwaraka, Baneswar and Kopai, and supply water to about 900 miles long irrigation canals. The project comprises the construction of a Dam, 2345 ft. long and 117 ft. high at Massenjore in Santhal Parganas, a reservoir with an area of about 24 sq. miles and a capacity of 12,21,000,000 gallons of water and also a 1013 ft. long barrage at Tilapara. The project is estimated to cost little over 15 crores.

The project, though primarily intended for providing irrigation facilities to the districts of Burdwan, Birbhum and Murshidabad, will also yield 4000 K.W. electric energy to speed up industrial development in these districts.

Hirakud
Project.

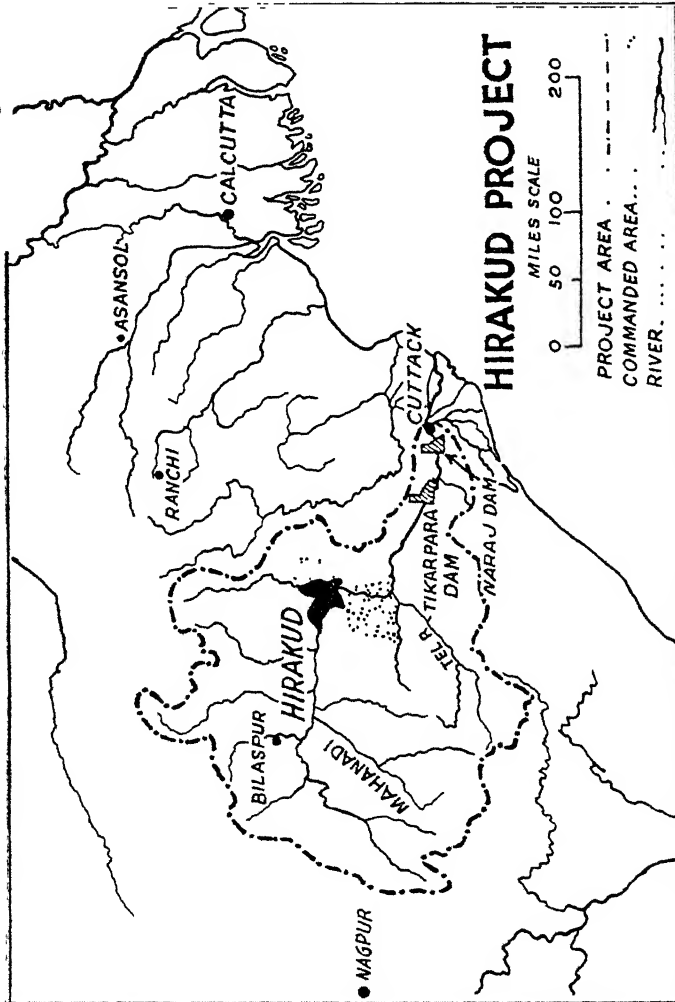
(3) *Hirakud Dam Project* is one of the three units envisaged for the development of the Mahanadi Valley. The other two projects will be the Tikarpara Dam and the Naraj Dam in the middle and lower reaches of the river.

The Hirakud Dam Project comprises the construction of an earth dam across the river about 9 miles upstream of Sambalpur and a subsidiary dam at the tail end of the power channel and a net work of flow and lift irrigation canals. The main dam will be 15,748 feet long with 12'8 miles of low earthen dykes on either side. The maximum height of the dam will be 195 feet and the reservoir formed will have a storage capacity of 6'75 million acre feet.

Utility.

The project is designed to control floods in the deltaic area of the valley, irrigate 1'9 million acres of land and generate about 300,000 K.W. of electrical energy. Thus

the project, when completed, will bring about agricultural development and industrial progress of the economically backward state of Orissa.

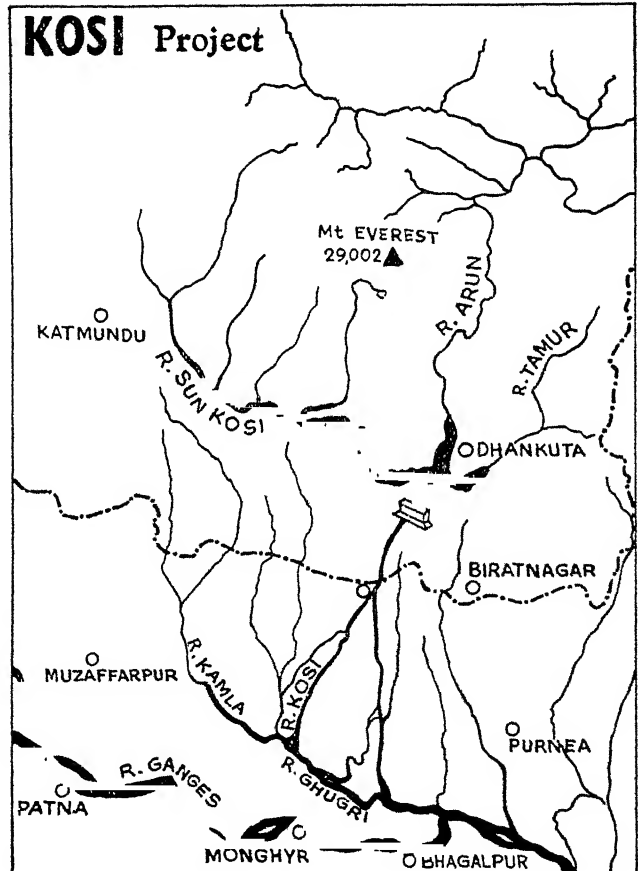


(4) *The Kosi Project* will comprise a dam, about 750 feet high, across the Kosi river at the Chatra Gorge in Nepal with storage capacity of about 11 million acre-feet

Kosi
Project.

Utility.

of water. There will be two barrages on the Kosi—one in Nepal and the other near the Nepal-Bihar border. The project will control flood, irrigate over 3 million acres of land, generate over 1·8 million K.W. of cheap power and it also includes silt control, soil conservation, drainage, reclamation of water-logged areas, malaria control, fish culture and recreation facilities among its subsidiary objects.

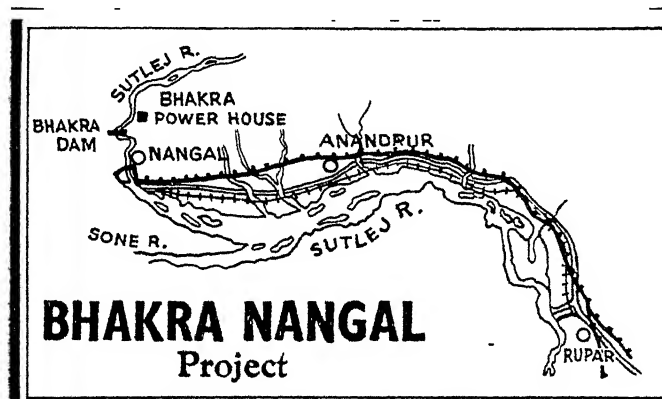


Kosi Project

The project may take ten years to be completed and will cost about Rs. 100 crores.

(5) *Bhakra Nangal Project*—One of the biggest projects in India was opened by the Prime Minister of India on 8th July, 1954. The first phase of this giant project was completed with the opening of the Nangal Hydel Canal which will not only feed the Bhakra main line and its distributary system, but will also generate a large quantity of hydro-electricity.

The principal feature of the project is the construction of a gravity dam 689 ft. high across the river Sutlej, 50 miles above Ruper in the Punjab. The dam will impound the flood waters of the river for the purposes of irrigation and generation of electrical energy. The reser-



Bhakra Nangal Project

voir behind the dam will be 50 miles long and is designed to store 5.6 million acre-feet of water. At Nangal, about 8 miles downstream, another dam is completed. This dam serves to regulate the daily variations in the supply of water for Bhakra Power Plant to divert the waters of the Sutlej to the Nangal Canal where they are used for the generation of power and to feed Bhakra Canals. There will be three power stations along the Nangal Canal. The grid serving the power stations will comprise about 2000

Bhakra
Nangal
Project.

miles of transmission lines. The length of the dam across the Sutlej will be about 1700 ft. at the top and the length of the widest part of the dam will be about 1100 feet. A 30 ft. roadway will be provided at the top. During construction of the dam the river will be diverted through two 50 ft. diameter diversion tunnels, each about a half-mile long.

Benefits. The project will provide irrigation facilities for nearly 6·6 million acres of land and will generate about 400,000 K.W. of electric energy. The industrial development of East Punjab has hitherto been retarded by the acute shortage of power as the State is without both coal and petroleum. So it is expected that the project will remove this deficiency and will facilitate industrial development of the State.

The Tungabhadra Project. (6) *The Tungabhadra Project* is a joint enterprise of Madras and Hyderabad States. It is one of the largest multi-purpose schemes in Southern India. The main feature of the project is a 160 ft. high dam, nearly 8000 ft. in length, across the river Tungabhadra, a major tributary of the Krishna. One 225 mile canal taking off from the right bank will irrigate about 250,000 acres in Madras and a 127 mile long canal on the left bank will irrigate another 450,000 acres in Hyderabad. Hydro-electric capacity to the extent of 60,000 K.W. will be installed on the Madras side and of 110,000 K.W. on the Hyderabad side at the dam site and at the falls along the canals. The reservoir will contain 2·6 million acre feet of water. The area around Tungabhadra project is rich in iron ores and rich and yellow ochres. There is also some copper and gold. Industries utilising these minerals, oil and sugar industries, paints and varnish industries will be developed in this area.

Benefits.

Rampadasagar project and its utility. (7) *Rampadasagar Project* comprises (a) a dam 428 ft. high across Godavari river, (b) two canals taking off on either flank of the dam—one extending upto Vishakapatnam port and the other extending upto Kistna river in the adjacent valley and even beyond the Guntur district upto the Gundalakama river, and (c) a hydro-electric generator station at the right flank.

(8) *Machkund Project* is designed to utilise a gross head of 874 feet of the Machkund river on the Andhra-Orissa border for generation of electrical energy. It comprises the construction of a 134 ft. high and 1300 ft. long dam at Jalaput to store 612,000 acre-feet of water, an 80 feet high diversion dam across the river 17 miles below ; a conduit comprising a 4000 ft. long concrete channel, a 4250 feet long free flow channel, a small pond and a 3000 ft. long pressure funnel to lead the water to the power house.

(9) *Kistna Pennar Project* aims at harnessing the waters of the great Kistna river draining 80,000 sq. miles to irrigate a little over 4.2 million acres of the first and second crops in the Rayalasema and in some of the coastal districts of Andhra State. It is also proposed to develop power of about 250,000 K.W.

(10) *The Narbada-Tapti Valley Project* comprise construction of four dams across the courses of the Narbada and the Tapti to control periodical floods which devastate the greater part of Bombay State. The irrigation of one million acres of land and generation of one million K.W. of power annually are the aims of the project.

(11) *The Ganga Barrage Project* aims at construction of a wide barrage on the Ganges near Tildanga in the district of Murshidabad, and of a road and a railway over this barrage to connect the northern and the southern parts of West Bengal. The project is designed by the Government of West Bengal and is estimated to cost about Rs. 50 crores.

When materialised, the project will facilitate irrigation facilities in the districts of Nadia and Murshidabad, will enhance navigability of the river Hooghly, will increase serviceability of the silted-up tributaries of the Hooghly, namely, the Bhairab, Jalangi, Matha-bhanga, etc., as useful inland waterways and will also further the development of the port of Calcutta.

State-wise distribution of Power and Irrigation Projects in the Five Year Plan

Part A States	Total expenditure (1951-56) lakhs of Rs.	Irrigation benefits (1000 acres) by 1955-56.	On completion.	Power benefits (1000 KW) by 1955-56.	On completion
Assam	2,83	2,18	2,18	5	75
Bihar	16,82	6,75	7,77	11	11
Bombay	33,12	4,74	8,93	83	84
Madhya Pradesh	9,08	1,14	1,84	73	73
Madras	84,32	4,35	6,08	1,96	3,07
Orissa	6,91	4,80	4,80	18	18
East Punjab	3,64	6,66	7,74	1,09	—
Uttar Pradesh	33,21	13,61	31,81	1,09	1,24
West Bengal	16,13	9,17	9,17	4	4
Part B States					
Hyderabad	28,00	3,06	7,31	53	53
Jammu & Kashmir	3,60	76	1,69	7	7
Madhya Bharat	5,56	83	1,52	15	18
Mysore	19,84	30	2,50	72	1,20
Pepsu	65		1,29		
Rajasthan	5,45	2,43	5,23	11	11
Saurashtra	6,88	1,08	1,20	12	12
Travancore-Cochin	15,13	17	1,68	81	81
Part C States					
Ajmer	11				
Bhopal	28				
Coorg	25				
Himachal Pradesh	93	75	1,00	1	1
Kutch	1,14	38	38		
Tripura	7				
Manipur	12			3	3
Vindhya Pradesh	51				

QUESTIONS

1. Give an account of the production of coal and iron ore in India. Is mining a robber economy?
2. Give an estimate of Indian coal and iron-ore resources. What are your suggestions for the better preservation and utilization of these resources?
3. Draw a map of India and show the important sources of supply of coal, iron ore and mineral oil. Also briefly

describe the industries which have developed around these centres.

4 In a sketch map of India show the regions producing coal, manganese and mica, and the principal railway systems which handle these minerals

5 Write an account of the mineral wealth of the Indian Union and draw a sketch map to illustrate your answer

6 Estimate carefully the coal and petroleum resources of India and locate the principal mines on a sketch map

7 What are the uses to which the following minerals are put and where are they found in India —(a) Copper, (b) Mica, (c) Manganese

8 Describe the principal coal-fields of India and discuss the present condition of the Coal Mining Industry.

9 Give an account of the mineral resources of India and the extent to which they are utilized.

10 Examine the important minerals to be found in India and the places where they are found

11 Examine the present position of the coal industry in India. Indicate the methods by which the condition of the industry may be improved

12 Examine the iron resources of India. Show how far these are located near the coal-bearing areas in India.

13. "India is the leading mica exporting country of the world and is likely to remain so." Examine the statement.

14. Give an account of the present position of India in respect to petroleum.

15. On a sketch map of India, show the regions where iron, manganese and mica are found. Which of these minerals are mined for home consumption? Name the countries of the world that compete with India in manganese for export markets.

16. In a sketch map of India show the coal fields of the country as well as the major industries which depend on coal for power.

17. Write an account of the natural conditions favourable for development of hydro-electric power. Which part of India is best suited for this purpose?

18. Examine the power resources of the Indian Union.

19. D.V.C. is described as a "multipurpose" project and why?

20. Explain the present and proposed schemes for generation of hydro-electricity in India. How does India stand as a producer of hydro-electricity in comparison with the other countries of Europe and Asia?

21. What do you know about the Damodar Valley Project? State the economic advantages Bengal and Bihar are likely to derive from it when the project materialises.

22. Analyse the geographical conditions suitable for the development of hydro-electric power. How far are these conditions in existence in India?

23. Write an account of the development of the water-power resources in India and discuss the benefits of such development on our economic life.

24. What do you understand by the term "Multipurpose" project? Also discuss fully the benefits likely to be derived when the Damodar Valley Project will be completed.

CHAPTER VI

MANUFACTURING INDUSTRIES

General
Survey.

India is one of the eight leading industrial countries of the world from the point of view of man-power employed. But considering the size and population of the country and its immense natural resources, this is, in no way, satisfactory and leaves much scope for further industrial development. The Indian factories today supply all the sugar, cement, matches and textile goods required for home consumption. A large part of the home demand of iron and steel goods, chemicals, paper, etc., is also met by the Indian mills. But compared to agriculture, manufacturing industries in India occupy a minor position as a means of livelihood. While 70 per cent of the people are engaged in agriculture only 10 per cent are employed in organized industrial establishments. Industrial development in India has only touched the fringe of Indian economic life and its effect on employment and purchasing power has not been so potent as of agriculture. Some amount of industrial development has taken place, more specially in those industries which obtain raw materials from agriculture. Heavy metallurgical industries have not yet been fully developed. During the World War II India emerged as an important supplier of manufactured goods to the Middle East and Far East. The industrial activities in India increased and that impetus led India on the road to industrialisation. Well-established industries, such as iron and steel, cotton

textiles, paper and cement, operated to full capacity between 1939-45 and expanded subsequently. Others also, such as light engineering, chemicals and pharmaceuticals, received a powerful impetus. New industries, such as locomotives, automobile, ship-building, bicycle, sewing machine, diesel engine, textile machinery, ball and roller bearing, and rayon manufacturing came into existence. But in the post-war period industries in India entered into a critical period. This critical condition developed due to the following causes :—(1) urgent need of repairs and replacements of industrial equipment due to a severe strain during the war, (2) unrest among labourers, (3) shyness of capital due to post-war slumps, and above all, (4) partition of the country which cut at the root of economic unity of the country with consequent loss to textile, jute and other industries.

India now produces consumer goods such as cotton, textiles, sugar, soap, matches and salt which are sufficient to meet the present home demand. But still now the basic capital goods and producer goods industries have yet to be fully expanded to meet the home demand. Machineries for industrial pursuits are not manufactured to meet the demand of the factories. There has been a small beginning in the production of synthetic drugs, antibiotics, dye-stuffs and organic chemicals.

An important feature of India's industrial development is the preponderance of foreign capital in the initial stage and a large share of foreign interests in India's industrial activities even at the present stage. The amount of foreign capital has been estimated to be £1,000 to £1,500 million, most of which is British. It is a happy augury that this foreign capital is in course of being liquidated and substituted by Indian capital.

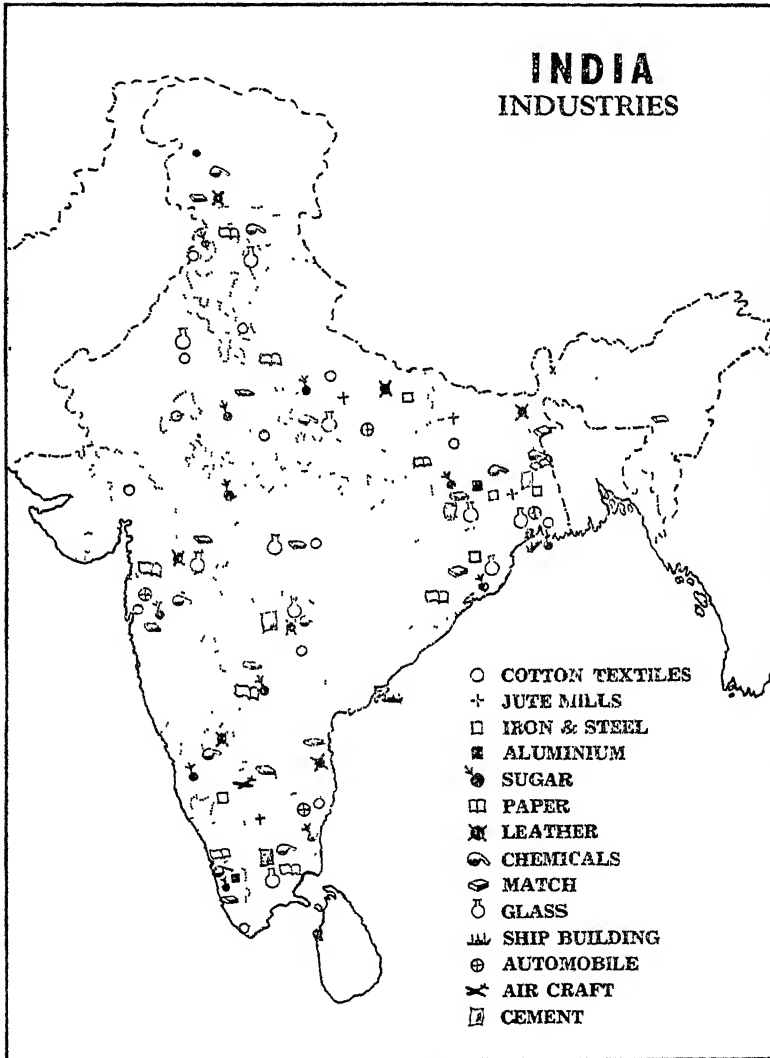
Another remarkable feature is that manufacturing industries of India have been unevenly distributed. These industries, for various reasons, concentrated in certain regions, such as Calcutta and its suburban areas, Western belt extending over Bombay, Ahmedabad and Sholapur,

Uneven distribution. Chotanagpur with Jamshedpur as the centre, and Madras and Mysore in southern India. This centralisation of industries is particularly noticeable in cotton textiles, jute, sugar, paper, chemical, matches, woollen, silk, leather and iron and steel production and this tendency towards excessive centralisation has resulted in uneven economic development of different parts of the country. To remedy this evil, decentralisation of industries on a planned basis is aimed at to offer, as far as practicable, equal opportunities to every region for economic development and for profitable utilisation of natural resources of every part of the country with uneven distribution of population, and, above all, to relieve certain areas of heavy concentration of industrial population and to raise the industrially backward areas to the level of parity with developed regions.

Concentration of industries in and around the chief ports. Most of the large-scale manufacturing industries are located in or around Bombay, Calcutta and Madras, the chief ports of India. Machinery and stores from Europe and other continents can be conveniently brought to these ports. Raw materials flow to these ports for export. The ports are also the centres of business activities ; hence banking facilities have grown up there. All possible economies in the purchase of raw materials and stores and in the marketing of products are made possible in these regions. Recently the industries are showing tendency towards decentralisation and regional specialisation. The last great war also showed the usefulness of establishing industries away from the ports. Again, for a vast country like India, there is further need for decentralisation of industries, if the industrial system is to be put on a healthy basis. The housing problem is also very acute in the port areas. Every effort should be made to decentralise the industries in future planning.

State and Industry. In an under-developed economy with agriculture as the main occupation development of industries is one of the chief sources for finding jobs for its growing labour force ; for, apart from the direct employment it offers, it creates jobs in various other sectors such as production of agricultural and mineral raw materials, distribution

of industrial products, communications, banking and insurance. The effects of industrialisation should be judged in this perspective. The tempo of industrialisation has



to be speeded up to find a permanent solution to our chronic problems of unemployment and under-employment. Paucity of capital, ill-framed policy of taxation, unstable economic

policy, under-utilisation of the capacity of certain industries, such as the engineering industry, are some of the factors which are responsible for retarding the development of our industries. The attitude of the Government towards industry so long was one of laissez faire, viz., the industrial progress to be best achieved by unregulated private enterprise. This doctrine underwent some modification after the attainment of independence. The State has now started to play an active role in the industrial development of the country. The present industrial policy of the Government is based on the Industrial Policy Resolution promulgated on 6th April, 1948. The First Five Year Plan has laid down the following policy for industrial development of the country :

Industrial
development
in the first
Five Year
Plan.

(i) Certain industries, such as manufacture of arms and ammunition, production and control of atomic energy and railways are to be run by the Union Government.

(ii) Coal mining, iron and steel, aircraft, ship-building, telephone, telegraph and wireless apparatus, and mineral oils, etc., have to be developed by the Government in co-operation with the private sector when possible.

(iii) For other types of industrial development co-operative societies have to be encouraged to run the industries.

(iv) Fuller utilisation of existing capacity in producer and consumer goods.

(v) Expansion of industries like iron and steel, aluminium, cement, fertiliser, heavy chemicals, and machinery to be aimed at.

(vi) To establish new plants for the manufacture of sulphur from gypsum, or pulp for rayon and newsprint, or the refining of ores, or scrap for non-ferrous metals so as to increase the supply of certain key materials vital for industry.

This Industrial Policy has since been revised in the light of experience acquired in course of working of the policy adopted in 1948 and of the operation and achievements of the first Five Year Plan. The revised Industrial

Policy, announced by the Prime Minister in his statement in the Lok Sabha on the 30th April, 1956, promises private industrial undertakings "as much freedom as is consistent with the targets and objectives of the National Plan", assures fair and non-discriminatory treatment in cases where both sectors exist in the same industry, and makes it clear that no revision has been made in the policies concerning division of responsibilities between the Centre and State Governments and in regard to foreign capital.

Seventeen key industries are listed in the schedule (A) of industries for whose development State will be exclusively responsible, and twelve in the schedule (B) of those which will be progressively State-owned. The remainder (not listed) will be left to the private sector. Extension of the public sector is justified on grounds of policy rather than expediency. Among the many new developments necessitating the revision of the 1948 policy statement, special importance is given to the directive principles of State policy contained in the Constitution and the acceptance of the Socialistic pattern of society.

The aim of the first Five Year Plan was to create conditions of sufficiency and plenty in food and raw materials. This was quite in keeping with the requirements of the country, impoverished by foreign exploitation and devastated by war and famine. In the draft frame of the second Five Year Plan, greater stress has been laid on the development of basic industries, such as those producing iron and steel, heavy machinery, electrical equipment, basic chemicals, etc. The highest priority has been given to the heavy industries, as with the development of the heavy machine-building industry it will be possible to fabricate various kinds of machinery required for the production of cement, fertilisers, heavy chemicals and factory-made consumer goods as well as machinery needed for the mechanical extraction of coal and other minerals and for large projects of irrigation, roads and buildings. This will release considerable foreign exchange resources which could be utilised to accelerate the pace of development. Great emphasis has also been laid on small-scale and household (cottage)

Second
Five Year
Plan in
relation to
industries.

industries which are labour-intensive with a view to provide large volume of additional work. Attempts will be made to expand the factory production of essential goods, such as cement, light engineering, drugs, etc., which do not compete with household industries. An amount of Rs. 1400 crores, comprising 25 p.c. of the net investment, has been allocated to the sector of industries and mining. This outlay is expected to accelerate the pace of production, and the provisional targets for the production of important goods, as envisaged under the second Plan, are indicated below :

Industries	Unit	Actuals 1950-51	1953-54	Provisional Estimates 1955-56	1960-61 Percentage of increase over the previous targets	
Pig Iron (for foundries)	m. tons	—	—	0.35	1.8	350
Finished Steel	"	1.1	1.1	1.3	5.0	285
Cement	"	2.7	4.0	4.8	10.0	108
Aluminium	th "	3.7	3.8	4.0	40.0	700
Fertilizers	Index	—	—	100	400	300
Heavy chemicals	"	—	—	100	300	200
Cotton textiles	m. yds.	3,718	4,906	5,000	5,500	100
Sugar	m. tons	1.1	1.1	1.4	2.1	50
Electrical goods	Index	—	—	100	166	66
Bicycles	thousands	101	290	500	1,000	100

Large
scale
vs.
cottage
Industries

Indian industries may be divided into two classes—
(a) Large-scale industries with power-operated machinery carried on in factories of various sizes, (b) Cottage industries carried on in the houses of the workers themselves with hand-operated appliances. The National Planning Committee divided Indian industries into three classes : Cottage industries, small-scale (or medium sized) industries and large-scale industries. From very early days, the cottage industries were supplying the people with all their requirements of manufactured goods. But most of the cottage industries of India are in a decaying condition at present. There is a need for reviving these industries. The progress of modern large-scale industry, however rapid, cannot possibly give full employment to the vast population of India. For the solution of unemployment problem in rural areas and also for supplementing the meagre income

of the peasantry, the revival of the cottage industries is an urgent necessity. Small industry makes for equitable distribution of wealth. The development of cottage industries will also help the village communities in India to attain the maximum amount of self-sufficiency.

Principal Large-scale Manufacturing Industries.

The Cotton Textile Industry. The Cotton Textiles Industry is not only largest, the most important, the most well-organised industry in India ; but what is more important, it is owned, manned and managed by Indians mostly. India is now the world's second largest producer of cotton textiles. She ranks second in the world in productive capacity, third in the number of persons employed, fourth in the quantity of raw cotton consumed and fifth in the number of spindles.

General
Survey.

During the year 1955, the total number of mills reached 483 with an installed capacity of 12'11 million spindles and 0'23 million looms. The Paid-up Capital in the industry now amounts to Rs. 114 crores, representing nearly 15 per cent of the total paid-up capital of all joint stock industrial undertakings in India, while the value of the annual output is estimated at Rs. 400 crores which is about 25 per cent of the total industrial output in this country. The total number of workers employed in this industry is 746,057 (in 1955) which is more than 25 per cent of the total number of employees engaged in the major industries of India.

	No of mills	Production yarn (in million lbs)	Production cloth (in million yards)
1948	408	1,456	4,423
1950	425	1,166	3,645
1951	445	1,295	4,188
1953	458	1,500	4,900
1955	483	—	5,078

The first cotton mill in India, *viz.*, the Bowreah Cotton Mill, was founded near Calcutta in Bengal in 1830. But at present Bombay is the principal seat of this industry in India, where the first industry was started in 1854. Since then the industry has experienced great development

History

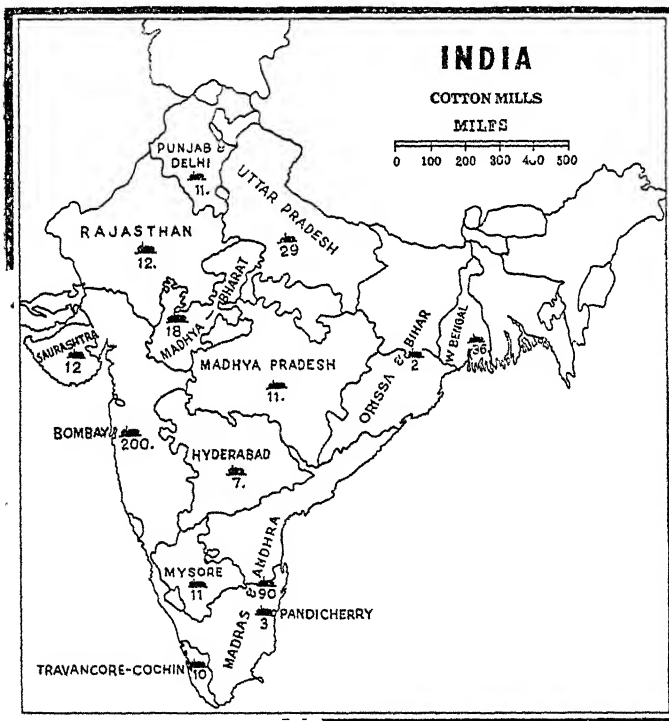
and expansion. The great advantage of Indian Cotton textile industry is the existence of a huge home market. The home demand is steadily increasing due to rapid growth of population and improved standard of living. The industry received a great fillip during First World War when the imports from U.K. declined. The Swadeshi movement after the war also helped the growth of the industry considerably. Then there ensued a period of great depression, which was intensified as a result of the Japanese competition. Protection was given to the industry by the Government in 1931 but the measure failed to give adequate relief to the industry. However, the industry managed to survive the period of depression. It registered substantial progress during the second Global War. During the period 1939-44, the total production increased by over 17 per cent, inspite of serious difficulties, such as the shortage of coal, lack of stores and spare parts, labour troubles, transport difficulties, etc. At present well over 400 crores of yards of cloth are produced by Indian mills for civilian consumption. The industry has a bright future. Given full employment and a balanced distribution of wealth, the domestic market alone will be big enough for a marked expansion in the productive capacity of the industry. Moreover, India's geographical situation is very favourable for the development of substantial and permanent export to Middle East China, South Africa, South East Asiatic countries, etc. At one time India had to depend largely on Lancashire for her clothing needs, but a stage has now been reached when not only her imports from foreign countries have practically stopped, but she is in a position to pay Lancashire back in her own coins. In fact, India has been exporting 100 million yards of cloth to Lancashire, the mother of machine-made fabrics—the figure for 1954 being 111·6 million yards.

Further development.

The most urgent needs of the industry for planned post-war development are :—(a) increase in home supply of long-staple cotton, (b) production of textile machinery within the country (c) provision for imparting technical education to workers and (d) research work. It is to be noted in this connection that the Indian Central Cotton Committee maintains its Technological Laboratory, com-

plete with an experimental spinning plant and a scientific laboratory together with a testing house for research on cloth fibre. The Department of Technology of the Bombay University is also carrying on useful research. Ahmedabad Mill Owners' Association has also started a Research Institution.

The distribution of the cotton textile industry in India is very irregular. Bombay State counts for more than half of the total number of mills. Other centres of production are Madras, Kanpur, Delhi, Nagpur, Madura, Bangalore and Calcutta. Distribution.



Bombay has several advantages over other states. It is situated very near the cotton producing tracts of the Deccan and the port of Bombay attracts all the cotton crop

Localisa-
tion in
Bombay.

of the black cotton soil for export purposes. Bombay also has the advantage of cheap and abundant supply of hydro-electric power from the rapid streams of the Western Ghats and a sufficiently humid climate which favours cotton spinning. Bombay's premier position is also due to highly developed systems of industrial finance and improved communication facilities. Ahmedabad specialises in the manufacture of yarns of higher counts and in the weaving of fine cloths. Raw cotton for this purpose is imported from Egypt and the U.S.A. Other centres in Bombay State are Sholapur, Surat, Broach and Jalgaon.

Cotton
industry
in West
Bengal.

West Bengal was the home of India's textile industry before the advent of the British. But since the middle of the last century she has lost her high position due to economic and political causes. The State has the widest market for cotton goods. The local mills produce about 30 per cent of the total consumption requirement of the State. Thus the prospect of cotton textile industry in West Bengal is very bright. She possesses many advantages for the development of the industry. West Bengal has coal to supply power. After the completion of the Damodar and More Projects, she will get a large amount of cheap hydel power to run the industry. The basins of Damodar and Mor can be utilised for the cultivation of raw cotton. West Bengal has also a large number of efficient labourers. Industrial areas and the power-producing areas can be very conveniently connected by roads, railways and rivers. West Bengal can also export her goods to the neighbouring states and to East Pakistan. A large amount of textile goods can also be exported to the Far Eastern markets through the port of Calcutta. She also has the added advantages of a textile machinery manufacturing organisation located at Belghurria near Calcutta. The present deficiency in raw cotton can be met by cultivation of medium-staple cotton in the districts of Midnapore, Bankura, Birbhum, Murshidabad, Maldah and Nadia. At present the cotton mills are localised in the Hooghly basin within a radius of forty miles from Calcutta. The mills are located at Sodepur, Serampore, Panihati, Shamnagar, Mourigram, Belghurria, Palta, Fuleshwar,

Salkia and Ghosery. Calcuta is the chief collecting and distributing centre.

The growth of the cotton manufacturing industry in Uttar Pradesh is due mainly to its excellent situation in the centre of India, commanding a large market and highly developed means of communication. Labourers are available in plenty and they are hardy and efficient. Cotton is grown all over the state, specially in the districts of Bulandsahar, Muttra, Aligarh and Agra. Good quality cotton is obtained from the East Punjab. Want of coal is a serious drawback, but now that hydro-electric projects are in course of being operated or completed, the development of the industry will be easier. Kanpur is the most important seat of the cotton manufacturing industry in the U.P. Cotton carpets are manufactured at Bareilly, Alighrah, Agra and Moradabad. But more cotton mills may be opened in Shahranpur, Alighrah, Hatras and Etwa. These towns are situated in the cotton producing regions and have the facilities of hydro-electric power and cheap transport. The last World War has given a great stimulus to the cotton industry of U.P.

Madras is the second largest cotton manufacturing State. Coimbatore, Madura, Tinnevelley, Salem, Malabar, Guntur, Bellary, etc., are the important seats of the industry. Most of the mills are worked by hydro-electric power. The industry is located in the heart of cotton-producing tracts. Madras specialises in the production of high class coatings, bleached shirtings, drills and khakis.

Madhya Pradesh has a fair number of mills with scope for considerable development of the industry in the State. Existence of raw cotton within the State is the greatest advantage. Nagpur is the most important centre. Cotton ginning and pressing is extensively carried on here.

Ludhiana is an important seat of cotton manufacturing in E. Punjab. Carpets are manufactured at Amritsar. Many cotton mills are located in and around Delhi. The most remarkable development has been made in Indian States. Most of the mills produce coarse yarn and cloth ;

Cotton
industry
in U.P.

Madhya
Pradesh.

Other
cotton
textile
centres.

but a few mills in Baroda are specialising in fine count cloth and Indore mills are producing coloured goods. There are about 28 mills in Baroda and 11 mills in Indore. There are also a few mills in Mysore, Gwalior and Hyderabad States.

Handloom
industry.

The handloom industry of India is another section of the Indian cotton industry. It is by far the most important cottage industry of India. According to a recent estimate, there are about 25 lakhs of handlooms in India, giving employment to about 60 lakhs of people. The handlooms have been supplying about 30 per cent of our cloth requirements. The demand arises principally from two quarters : (a) for highly artistic and finished goods and (b) for coarser goods needed by the poor village folks. The most important point to be noticed in connection with the state-wise distribution of handlooms is the pre-eminent position of Assam which is, perhaps, one of the least industrialised of the states.

Problems
of the
Handloom
industry in
India.

Handloom weaving is carried on in almost all the districts of West Bengal. In fact, there is no part in India where this industry is not important. The handloom industry has shown the most amazing vitality in face of severe competition from mill-made products, both imported and indigenous. The industry suffers from the following difficulties :—(a) The artisans are generally poor and cannot afford to purchase yarns in the best markets. There are middlemen who supply the yarns on condition for purchasing the finished products at a cheaper price. In this way, the poor weavers are exploited by the mahajans or middlemen. (b) The artisans have little idea about the nature of the market and are absolutely dependent upon the mahajans or middlemen for the sale of their output. (c) The artisans cannot ensure uniformity in design and quality and this accounts for low and uncertain prices for their products. (d) The weavers, in most cases, are ignorant of the up-to-date method of production and their poverty and conservatism stand in the way of the ready adjustment to the improved method of production. Lastly, (e) they suffer from dearth of capital and co-operative

organisations are yet too meagre. The chief means suggested for improving the handloom industry are: (a) spread of elementary and technical education among the weavers, (b) supply of cheap credit, (c) the use of improved equipment, (d) co-operation among weavers and (e) better marketing facilities.

Domestic spinning is not of much importance now and the handloom weavers mainly depend on the mills for the supply of yarn. In this field the cottage worker is unable to hold his own against the mills. The Charkha movement of Mahatma Gandhi has given a stimulus to this industry. Domestic spinning. The activities of the All-India Spinners' Association has been very useful. The Khadi industry owes its present position to the untiring efforts of Mahatma Gandhi. The Khadi. industry will occupy a prominent place in our economic and political history. It ensures decentralisation of production and demonstrates the value of self-reliance on the economic life of an individual. The serious handicap retarding the growth of this industry is the high cost of production. Attempts should be made to improve the technique of production as to reduce the cost of production.

The Jute Mill Industry. The jute and cotton manufactures are outstanding examples of progress of the modern large-scale industry in India. The progress of the industry can be gauged from the fact that India has today become the chief manufacturer, consuming more than 60 per cent of the raw jute produced in the India-Pakistan sub-continent. General survey. It is the second-most important industry in India in respect of the number of workers employed, and the country's largest dollar-earner. The industry employs more than 3 lakhs of workers and the total capital invested in it is about Rs. 30 crores. It has the distinction of accounting for over one-third of the total export trade of the country, amounting to Rs. 140 crores.

Since the time that George Auckland started the first jute mill at Rishra in Bengal in 1855, the foundation was laid for the growth and development of India's jute industry. In course of time, the industry grew by leaps

and bounds till today we have 113 units out of which 101 are concentrated round about Calcutta, while there are 4 each in Bihar and Madras, 3 in Uttar Pradesh and one in Madhya Pradesh. While George Auckland's mill—the forerunner of this modern streamlined industry, had a capacity—of only about 2000 tons per year, that of the present day industry is over 13 lakh tons.

Localisa-
tion on the
bank of the
river
Hooghly

The industry is highly localised in a small area around Calcutta on the Bank of the Hooghly. The cultivation of raw jute is concentrated in the Ganges-Brahmaputra Delta in Bengal. This raw jute can be easily sent to Calcutta by the river or railways. The manufactured jute is easily shipped by boats to Calcutta for export. Coal is obtainable from the fields of West Bengal and Bihar. Facilities of finance and banking are readily available. These inherent advantages account for localisation of the industry in West Bengal.

Production of Jute Goods

	(000 tons)	
	Hessian	Sacking
1953	389	450
1954	389	506
1955	400	562

Jute manufactures may be divided into four classes :
 (i) gunny bags for paking agricultural produce, (ii) gunny cloth or hessians used for baling cotton, wool and other fibres and bulky commodities, (iii) coarse carpets and (iv) cordage. Fine and clean jute yarn of uniform size and quality is used in the cable industry. Unlike cotton industry, the jute industry of India is essentially an export

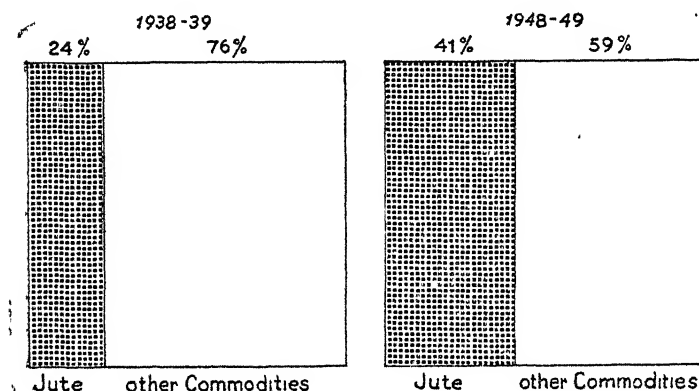
Products.

Export of Jute Goods

	(000 tons)	
	Hessian	Sacking
1953	388	324
1954	370	430
1955	407	468

industry. Jute bags and cloth have a wide demand throughout the world. In 1880-84 the average value of jute manufactures exported by sea was only Rs. 1.2 crores, whereas in 1950-51, the value of India's total exports of jute yarns and manufactures amounted to Rs. 113.89 crores. About 90 per cent of the jute goods manufactured

Jute in the Export Trade of India



in India are exported and about a third of all India's foreign exchange earnings in 1948 came from jute and 66 per cent of hard currency earnings had their origin in the same source. The jute products are mainly exported to the U.K., Germany, France, Italy, Egypt, South Africa, Java, Japan, Cuba, Australia, Argentina, Canada, the U.S.A. and the Netherlands. Among the buyers of Indian jute products U.S.A. occupies the prominent position, consuming as much as 60 per cent of the annual exports of hessian cloth. U.K. is the largest buyer.

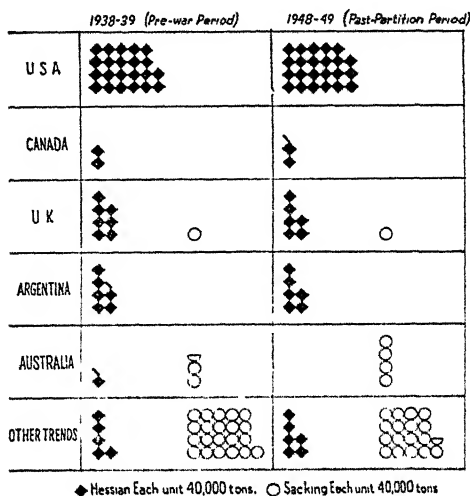
Export.

One peculiar feature of the industry is that since the industry is based not a little on the demand for export, any slackness in the world demand during a year or a season causes the industry to close a portion of its installed capacity. This bespeaks the absolute dependence of one of our important industries on uncertain foreign demand. The

Competition of substitutes.

The products of the jute mill industry are facing serious competition from substitute products. Many substitutes have been discovered in several parts of the world to replace jute as a sacking material. Paper bags and cotton bags

Destination of Jute Exports



are being used in large scale in the U.S.A. Russian hemp is also trying to capture the market of jute. Jute bags in the U.S.A. and other countries are being displaced by the use of elevators and bulk handling in transit in grain trade. Though these substitutes have not so far met with any marked success, replacement of jute by paper, cotton, hemp and other fibres in foreign countries has greatly restricted the market for jute products. The Indian Central Jute Committee has a laboratory for Technological Research at Calcutta and is making researches to find out new uses of jute. The Institute of Jute Technology founded in 1948 by the Indian Jute Mills Association under the auspices of the Calcutta University is also engaged in making researches in the same direction.

Since the partition of India, the Indian mills which are mostly located in West Bengal are facing serious difficulties in procuring raw jute from Pakistan, which claims

the major portion of the jute-growing territory of undivided India and has been imposing export duty of Rs. 20 per bale in addition to excise duty on jute export. Other difficulties of this industry include higher wages and higher replacement cost. The price of jute manufacture has increased abnormally with the result that the foreign demand for jute manufactures has declined substantially. For the above reasons the jute mill industry is facing a serious crisis. It is unsafe to depend upon the supplies of raw jute from Pakistan. A permanent solution of the problem lies in the extension of cultivation of jute within the Indian Union.

At the present moment many of these problems have been got over. At the current price levels, the advance of substitutes such as paper bags has been halted. It is, however, of prime importance that the Indian industry must produce goods at competitive rates. To this end, rapid progress must be made in modernisation which may counteract the comparatively rigid labour costs. But the industry must not rest contented with only the programme of modernisation cum rationalisation. It has, moreover, to strive for expansion of its markets which are verily world-wide. Happily, notable advance has been made in this direction and the recent delegations led by the I.J.M.A. nominees have made a definite mark on the existing and potential customers abroad.

The Silk Industry.—In the early days of the East India Company silk was an important article of commerce, but its importance declined as a result of the competition of the silk yarn and silk piece-goods from Japan and Italy. More recently the industry suffered in competition with Chinese silk and artificial silk manufactures, and export of both raw and manufactured silk considerably decreased while imports were steadily increasing. The second World War proved great incentive to the revival of the industry, for imports were restricted and silk was required for the defence services.

Silk is generally obtained in India from the cultivation of mulberry silk-worms. There are three principal areas

Distribu-
tion.

where raw silk is found :— (i) Southern portion of the Mysore plateau with Coimbatore district of Madras, (ii) the Murshidabad, Malda and Birbhum districts of West Bengal and (iii) Kashmir and Jammu with neighbouring districts of the Punjab. There is also a considerable cultivation in Chotanagapur, Orissa and parts of Madhya Pradesh of the Tasar silk-worm and in Assam of the Endi and Muga silk-worm. Silk is also obtained in north Bihar. Kashmir is the most important producer of silk in India. The mulberry trees are abundant and there silk-worms thrive best. Silk industry is a monopoly there and the major portion of the products is exported to Europe.

Most of the raw silk is turned into finished product in India as a cottage industry. The chief silk-weaving centres are Murshidabad, Malda, Bishnupur and Bankura in West Bengal ; Bhagalpur in Bihar, Benares and Mirzapur in the U.P.; Nagpur in the M.P.; Amritsar and Jullunder in East Punjab ; Ahmedabad, Dharwar and Poona in Bombay ; Bangalore in Mysore ; Berhampore in Andhra ; Trichinopoly, Salem and Tanjore in Madras, and Srinagar in Kashmir. There are also power mills manufacturing silk goods in Bombay, Calcutta, Ahmedabad and Bangalore.

Production. India produces approximately twenty-one million lbs. of mulberry raw silk valued at between Rs. 6'5 to about Rs. 8 crores a year and about one million lbs. of non-mulberry silk, i.e., Tassar, Endi and Muga valued at Rs. 2 crores. Raw silk, whether mulberry or non-mulberry, is, in itself, a raw material. This raw material has to be thrown and twisted and silk yarn thus produced from raw silk is used for weaving silk textiles and other silk goods.

Methods
of improve-
ment.

The Sericulture Industry of India has been given protection since 1930. For the improvement of this industry, a Central Silk Board has been established in 1949 to undertake technological and economic researches, devise means for improved methods of mulberry cultivation and to improve the quality and production of raw silk to be marketed. The revival of the silk industry is possible only on a comparative basis with the support of the Government.

The silk weavers are poor and cannot buy necessary implements.

India exports small quantities of raw silk and silk cocoons. The United Kingdom and France are the principal buyers.

It is interesting to note in this connection that it has been decided to set up, very shortly, a Rs. 38 lakh silk spinning mill at Maldah in West Bengal. The cost of setting up the first silk-spinning mill in this state will be shared equally by the Union and the West Bengal Governments. One of the major silk producing centres in India, West Bengal suffered greatly from the handicap of a silk spinning mill that could help expanding the market of silk produce. West Bengal produces annually about 3½ lakh lbs of silk yarns. The setting up of the silk spinning mill, it is claimed, will cut down the prevalent prices by about half and will provide unique potentiality for expanding the market for the silk products of the state. The mill will utilise the huge quantity of silk wastes of the state which are at present exported at a nominal cost.

Silk
Spinning
Mill in
West
Bengal.

The Woollen Industry—India is a tropical country and the demand for woollen and worsted goods is restricted and seasonal within the country. The woollen industry in India is mainly a cottage industry producing carpets, shawls, blankets, etc. Blanket weaving is carried on throughout India. “It is immune from the competition of machine-made goods, which cannot stand the rough wear to which the Kambli is subjected.” This industry has bright prospects provided its possibilities are systematically explored.

General
Survey.

Due to variations of climate, the production of wool varies in different parts of India. The main areas of wool production are Jodhpur, Bikaner, Kashmir, Uttar Pradesh, Madras, East Punjab, Hyderabad, Jaipur and Bihar. Kashmir and Amritsar are noted for the manufacture of shawls of good quality. The wool for shawl-making comes mainly from Tibet. The industry is now

Productio

in a decaying condition due to foreign competition. Carpet weaving is a very important cottage industry in India, but it is now in a decaying condition on account of the ignorance and poverty of the weavers and the absence of organisation. The chief centres of the carpet industry are Amritsar and Multan in the Punjab, Jaipur and Bikaner in Rajputana, and Agra and Mirzapore in the U.P. The bulk of the products are exported to foreign countries. The annual production of wool in Indian Union is estimated at 55 million lbs. which can be roughly classified under—(a) Hill wools used in the manufacture of blankets, tweeds and lower quality of woollen shawls, and (b) Plain wools, both of coarse and fine type ; coarse type is used for low grade blankets and rugs and fine types for better class blankets, tweeds, carpets, etc. In 1945 there were 32 woollen mills in India employing an average of 18000 persons and producing about 15 million pounds of woollen goods. The most important centres of manufacture are Kanpur, Dhariwal, Bangalore and Bombay. These mills use home-made wool mainly, although it is short staple. For the manufacture of finer classes of goods, wool is imported from Australia and S. Africa. The scarcity of raw material of a good quality is an obstacle to the growth of the industry.

Indian manufactured wool in the shape of rugs, shawls, carpets and piece-goods are exported to U.K., U.S.A., Canada and Australia.

The Iron and Steel Industry—Indian Union is the second largest producer of iron-ore among the Commonwealth countries. Her output falls far short of the existing volume of demand. Compared with the U.S.A., U.K. and France, she is very backward in this branch of manufacturing industry. India possesses immense scope for development of this industry. India has many advantages for expanding her iron and steel industry :—(1) large deposits of iron ore are found in Singbhum, Mayurbhanj, Keonjhar and other adjoining districts of Orissa and in the Chanda, Rajhore and Drug districts of M.P. In Mysore large deposits of iron occur in the Bababudan hills. In Madras deposits of iron ore occur in Salem,

(2) Coal fields are not far from them generally, but lack of coking coal has retarded the development of Salem and M.P. iron ore deposits, (3) limestone, dolomite and manganese, sufficient for the purpose, are found nearby, (4) home market is large and expanding. These natural resources could not be fully utilised in the past owing to want of industrial experience and training and cut-throat competition of cheap foreign goods.

The earliest attempt to manufacture pig iron on modern lines was made as long back as 1830 in the Madras Presidency. But the attempt was not successful. The first factory in India to show the commercial possibilities of successful extraction of iron was the Barakar Iron Works at Kulti started in 1889. The establishment of Tata Iron and Steel Works in 1907 by Mr. Jamshedji Tata at Sakchi marked a new era in the history of the industry. Since then the industry has made phenomenal progress. The World War I (1914-18) gave an effective stimulus to the industry. The protection extended to the industry since 1924 contributed a great deal to the development of this industry. The progress of the industry is evident from the fact that while an average of 35,000 tons of pig iron annually was manufactured in the earlier years of the present century, the total quantity of pig iron manufactured in 1954 rose to 1,903,441 tons. The quality of the product is also upto the continental standard. More than 50 per cent of the output is absorbed by the steel industry in India. The manufacture of steel ingots also increased from 78,000 tons in 1913-14 to 1,225,678 tons in 1954. It is also noteworthy that the imports of iron and steel into India came down from 608,000 tons in 1930-31 to 200,000 tons in 1953. The World War II (1939-45) again gave a fresh stimulus to the industry. The deterioration of the shipping situation and an increased war-demand forced India to strive for a larger measure of self-sufficiency. As compared with the pre-war year 1938-39 the iron and steel production in India showed a substantial increase. The increase was 14 p.c. in the case of pig iron, 19 p.c. in the case of finished steel and 28 p.c. in the case of steel ingots. Since then our position has been gradually

improving, showing marked increase in our exports and decrease in our imports of pig iron and steel manufacture.

Plans
for develop-
ment.

The Iron and Steel industry is a 'key' industry and its national importance cannot be exaggerated. India is still dependent to a large extent upon foreign iron and steel inspite of her own increasing production. India's resources are sufficient to wipe out her huge imports. Special types of steel for the engineering and machine tool manufacturing industries are yet to be made. Planned attempt in this direction is an urgent necessity. The future of this industry is very bright and it will be brighter still if it develops as a national industry. The State is playing a progressively active role in the development of this industry. An agreement was signed on 15th August, 1953, between the Government of India and a German Combine of two machine firms, Demag and Krupp, in order to build up a new steel plant. The plant under the name of Hindusthan Iron and Steel Works, which is to occupy a central place in the country's Five Year Plan, will be located at Rourkela in Orissa. It will have an initial capacity of half a million tons, later to be expanded to one million. The agreement provides for both financial and technical participation in the plant by the German Combine. The estimated capital cost of the new plant is 150 million with a German participation of upto 20 million rupees.

There has been another agreement between India and Soviet Union for establishing a steel producing plant in Bhilai in the Durg district in M.P. Iron ore, limestone and manganese are found here in close proximity and in abundant quality. This scheme also ensures technical and financial collaboration. There is also a scheme for establishing an iron and steel works at Durgapur in W. Bengal.

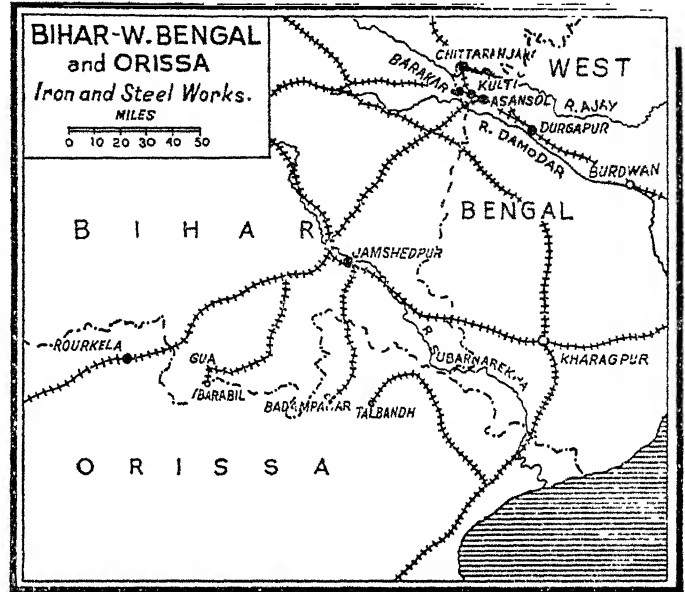
There are now thirteen Iron and Steel mills and quite a large number of foundries employing about 200,000 workers. Of these, three factories namely the Tata Iron & Steel Co. at Jamshedpur, The Indian Iron & Steel Works at Burnpur and Kulti and the Bhadravati Works at Mysore

are the most important. The Tata Iron and Steel Co.'s works at Jamshedpur is the greatest single work east of Suez. The Company was floated in 1907 with purely Indian capital, after the discovery of large deposits of high grade iron ores in Myurbhanj by the late Sri Pramatha Nath Bose, an eminent geologist of India. Iron was made first in 1911 and mild steel two years later. The Company owns valuable iron-ore concessions at Gurumahisani, Salaiptet, Noamundi, Badampahar, at distances ranging from 40 to 80 miles. Coal is obtained from Jharia field at a distance of little over 100 miles. Manganese, dolomite limestone are obtained from the neighbourhood. The Jamshedpur Works is situated in a narrow valley formed by the rivers Subarnarekha and the Khorkai. Supply of water is obtained from these two rivers, though they are of no use for navigation. The Eastern Railway connects the place with Bombay and Calcutta which are the biggest markets for iron and steel goods. The iron ore and coal supplies are brought to the works by the branch lines of this railway. The labour force is recruited from the densely populated Ganges Valley, mostly from West Bengal and Bihar.

A number of subsidiary industries have grown up around Jamshedpur. Of the various manufacturing companies mention may be made of the Tin Plate Company of India Ltd., The Indian Cable Company, The Indian Steel and Wire Products, The Tatanagar Chemical Company, The Tatanagar Iron Foundries and The Engineering and Machine Manufacturing Company. "Jamshedpore and the surrounding territories are thus developing into a veritable beehive of modern industries."

The second most important iron and steel manufacturing centre is in the neighbourhood of Asansol on the coal fields. The concerns, namely, the Indian Iron and Steel Company (Kulti) which was started in 1918 and with which has been merged The Steel Corporation of Bengal, and Standard Wagons Ltd., are under the management of Messrs Burn & Co. of Calcutta. Coal is obtained locally, but iron ore and limestone come from Orissa. The region is served by the Eastern Railway, and is only 130 miles

from Calcutta. There is a network of branch lines of railways to bring the raw materials. The water supply is obtained from the Damodar and the Barakar rivers.



Bhadravati
Iron and
Steel
Works.

The only iron smelting plant in South India, the Mysore Iron Works, located at Bhadravati, was started in 1923. The ore is mainly obtained from the mines in Babubudan Hills. It is also well situated for manganese and limestone but no coal is available. Charcoal is used, instead of coke, in the blast furnaces. It is obtained by distillation of wood from the large forest areas in the neighbourhood. The Works is situated on the river Bhadra, which supplies water requirement of the industry. Labour is available in plenty. A Cement Works has been started here to utilize the slag (waste products). A chemical industry is also working to utilize the bye-products.

Other
works.

Two other works may be mentioned although they are not so important as the above mentioned ones. The United Steel Corporation of Asia is located at Monoharpur, working on iron ores drawn from Keonjhar mines in Orissa.

The National Iron and Steel Co. Ltd. was floated in 1934 for the manufacture of mild steel rounds, bolts, nuts, etc. The factory is situated at Belur near Calcutta. Besides these many indigenous furnaces are working all over the country.

The prospects of setting up iron and steel industry in the States of Madras and Andhra are quite bright. These States possess almost inexhaustible reserves of high grade iron-ore required for the industry. Charcoal and hydro-electricity may be used as better substitutes for coal, which is deficient in these areas. Limestone and dolomite are available in Salem, Coimbatore and Trichinopoly, while other auxiliary materials like refractories, fire clay, magnesite, chromite and siliceous materials are to be found near iron-ore deposits.

possibilities
of develop-
ment.

To-day the iron and steel industry in India faces the future with confidence. The immense natural resources of the country, its position of easy accessibility to the markets of Asiatic countries, the proved metallurgical skill of its iron masters and steel founders, and the commercial ability already displayed in the development of the export trade in pig iron, these together with the great potential and growing home market for steel goods of every description, all presage expansion when world commerce returns to its normal channels.

Future
of the
industry.

Aluminium Industry—The aluminium industry is daily gaining in importance because of its great demand in the manufacture of insulation and paints, aircraft, bus bodies and railway coaches, chemicals and breweries, and in building and architecture. The metal is very useful because of its lightness, corrosion-resistance, electrical conductivity and ease of fabrication.

Utility.

The aluminium industry is still in its infancy in India. The country possesses vast deposits of good bauxite scattered almost all over the country, major occurrences being in Bihar, Bombay, Madhya Pradesh, Orissa and Kashmir. If the industry could not make much headway in the past, it was due to deficiency in power, particularly in those

Production
and
Production
Centres.

regions where major deposits occur. With the introduction of hydro-electricity, the difficulty has been greatly removed, and the aluminium industry is being rapidly developed.

The Aluminium Corporation of India Ltd. was founded in 1943 at Anupnagar near Asansol in West Bengal. Alwaye in Travancore, Belur in West Bengal and Muru in Bihar are the other important seats of this industry. The second World War gave great impetus to this industry, and as a result, during this period a number of small units were established in Bombay and several other places. In 1948 a new aluminium works was established near Katni in Madhya Pradesh. This centre is now being managed by the State Government.

India imports annually about 7,000 tons of aluminium goods. For protection and development of this indigeneous industry, duty has been imposed upon import of aluminium goods.

Brass and
bell-metal
industry.

Brass and Bell-metal Industry.—Manufacture of brass and bell-metal utensils is an important cottage industry in India. This industry has not to face any direct foreign competition, although an indirect competition in the shape of aluminium and enamelled iron wares exists. Indians use large number of these utensils and vessels in their daily lives. This industry is carried on mainly in the districts of Benares, Mirzapur, Lucknow, Moradabad, Madura, Mysore, Murshidabad, Midnapur and Bankura. The products of Khagra in Murshidabad are noted for their wonderful artistic design.

Sugar Industry.—India is the largest producer of sugar in the world. Sugar industry is one of the biggest organised industries of India.

Sugar
industry.

The sugar industry in India has developed within only fifty years. The first sugar mill on modern lines was started in Bihar in the year 1903. During the first 30 years only about 50 mills were established. The levy of protective import duty on foreign sugar imposed in 1931

helped the growth of this industry to a great extent. The industry made rapid development, and only during the next 20 years more than 100 sugar mills were started. The sugar industry is now the third largest industry of India, and it contributes about 26% of the world's production of cane sugar.

The important centres of sugar industry in India are Distributed in Uttar Pradesh, Bihar, Madras, Bombay and West Bengal.

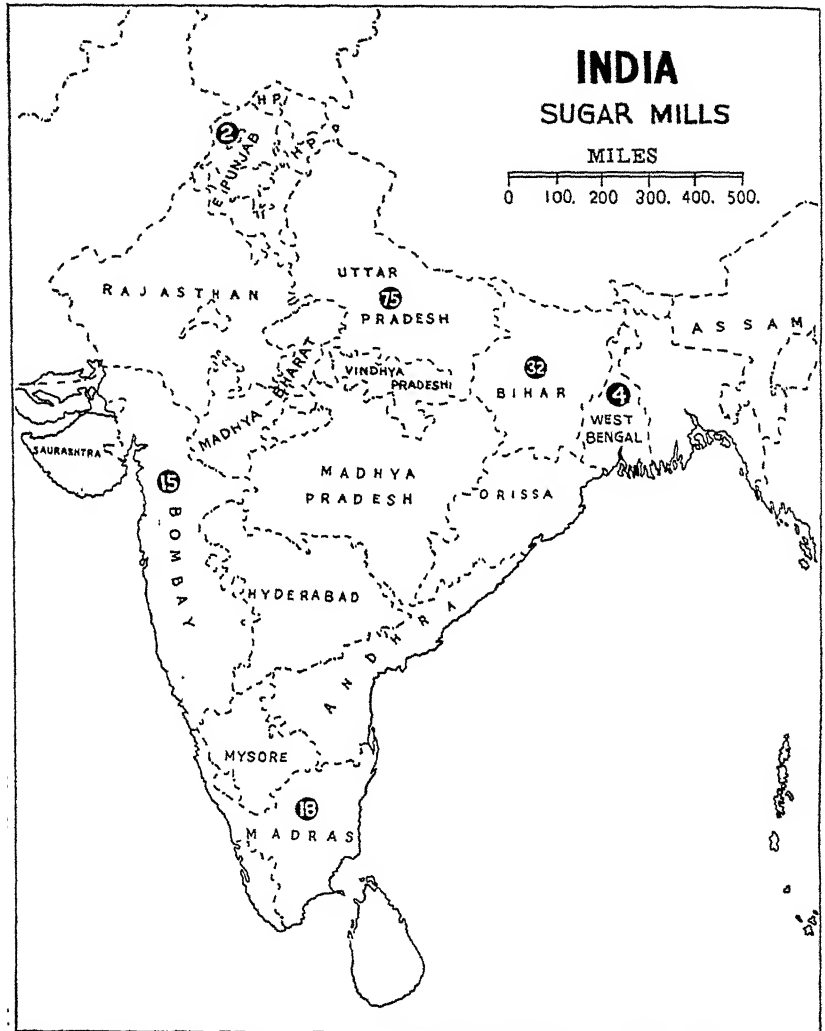
Geographical Distribution of Sugar Factories (1953)

States	No. of factories	States	No. of factories
Uttar Pradesh	72	Ajmer and Bhopal	2
Bihar	30	Orissa	2
Madras	16	E. Punjab	1
Bombay	15	Kashmir	1
Mysore	6	Mysore	1
West Bengal	4	Saurashtra	1
Hyderabad	3	Travancore-Cochin	1
Rajasthan	2	Vindhya Pradesh	1
Pepsu	2		
	<hr/> 150		<hr/> 10
		Total	160

At present the sugar industry in our country is concentrated in the two notable sugar-cane producing States of Uttar Pradesh and Bihar. These two States produce roughly 75 p.c. of the total production of the country. But according to eminent economists, the localisation was mainly due to a desire to make quick profit by taking advantage of the protective duty imposed on imported sugar by the Government. The natural advantages that exist in these States are not entirely of an ideal nature. Bombay, West Bengal, East Punjab and Madras have the same, if not better advantages. As regards raw materials, U.P. and Bihar are very favourably situated. These two States alone account for more than 75 per cent of India's production of sugar-cane. Hence cost of production is comparatively low because of nearness of the factories to raw materials. Further the sucrose content in the cane is the highest in these States. But there are some drawbacks in that, the yield per acre is very low and the sugar cane produced is

Localisation of the industry.

not of the best quality. However, these drawbacks can be remedied with improved standard of cultivation. As far as



the supply of power is concerned U.P. and Bihar have got very great advantages. These are in close proximity to the coal fields of Bihar and West Bengal. Labour is com-

paratively plentiful and is freely drawn from the densely populated rural districts of the States. The existence of comparatively satisfactory conditions has led to a more settled factory population here than elsewhere, and settled labour population is much more helpful to an industry than migratory efficient labour. Kanpur which is an important railway junction in the U.P., holds a central position being situated half-way between Bombay and Calcutta, and is a convenient manufacturing and distributing centre and the sugar of U.P. finds useful outlet through Kanpur. The other centres of sugar manufacturing in U.P. are Lucknow, Allahabad, Moradabad, Meerut, Gorakhpur, Rampur (State).

Bihar is the second largest sugar producing State in India. The industry is mainly located in North Bihar, Bihar although in recent years several mills have been started in South Bihar also. The districts of Saran, Champaran, Darbhanga and Muzaffarpur have the largest number of mills.

The position of West Bengal in the production of sugar is unsatisfactory. But the State possesses certain natural advantages for development of this industry and the prospects of the industry in West Bengal are very bright. Large areas are eminently suitable for growing sugar-cane and the yield per acre in this State is much higher than that in U.P. or Bihar. The quality of sugar-cane can be improved by introducing better seeds. West Bengal is one of the largest sugar-consuming states of India. The soil and climate of North-West Bengal and of the districts of Nadia and 24 Parganas are favourable for cultivation of sugar-cane. As regards capital and labour supply, West Bengal is not placed in an inferior position to the other states of India. The existence of the coalfields is an additional advantage. Economy in railway freight charges on coal, raw materials and finished goods is an advantage for her over U.P. and Bihar. Her excellent railway system and riverways bring the source of power at a cheap cost to the doors of the mills. The port of Calcutta brings other sugar-consuming countries within easy reach of West W. Bengal.

Bengal. So, West Bengal can take to sugar industry more earnestly as it offers exceptional advantages.

Processes
of refining.

In India three different processes of refined sugar manufacture are prevalent, and they are (1) direct from cane in modern vacuum pan factories, (2) from cane by indigenous open pan factories, i.e., "Khandsaris" (through the intermediate process or Rab) and (3) from gur refined in modern factories. The Indian Institute of Sugar Technology at Kanpur is carrying on research on the scientific and technological aspect of sugar manufacture since its establishment in 1936 and its fruitful studies are already being adopted, although, to a very limited extent, by the factories.

Subsidiary
Industries.

Growth of the Sugar industry has led to the establishment of a host of subsidiary and by-products industries in the country. Confectionery and fruits preserves industries have been developed. Sugar is also used in pharmaceuticals and chemicals. Besides, the three main by-products of the sugar industry, i.e., bagasse, press mud and molasses are used as raw materials by a number of industries, some of which have already been started, and some others are in the process of being established. Bagasse is utilised in the manufacture of paper pulp and card board. Considerable work is being done for extraction of wax from press mud. Molasses is used in the manufacture of aconitic acid, industrial and power alcohol, chemicals, tobacco-curing, etc. At present there are 44 distilleries in India which produce alcohol from cane molasses. Power alcohol is mixed with petrol for consumption as motor fuel.

Prospects
and
Problems.

The demand for sugar in the country is expected to go up steadily. In 1952-53 the actual consumption was about 16 lakh tons against 12 lakh tons previously. The actual production in the country could not keep pace with this abrupt increase in consumption. The result had been that after a lapse of about 15 years the country had to import sugar to bridge the gulf between internal production and the increasing consumption. The further growth of the industry will mainly be conditioned by available supplies of

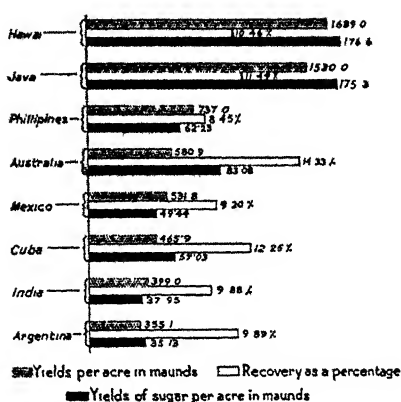
cane and its quality. The yield and quality of Indian cane are at present among the lowest in the world. Both have to be improved considerably to enable the factories to produce sugar at competitive cost. The sugar factories are already helping the growers in their areas with loans, implements, seeds, technical advice, etc. The industry is also in urgent need of reduction in its burden. It has to pay a large number of taxes, Central, State and Local; and these go to push up the cost of production of sugar disproportionately. Heavy incidence of taxation and poor quality of cane are, to some extent, responsible for high price of sugar. The industry is taking steps to modernise and rehabilitate the plants within the means allowed by the rigid cost structure and heavy taxation.

Consumption during the Second Five Year Plan is expected to increase further, and the Development Council for Sugar has, therefore recommended a target of 22·5 lakh tons for the year 1960-61 as against the revised target of 18 lakh tons for the First Five Year Plan. In order to increase production to this figure, the Development Council has recommended a production capacity of 25 lakh tons. The sugar industry has thus an important part to play in the country's march towards attainment of economic prosperity.

The yield of sugar-cane per acre is 13 to 14 tons and the yield of sugar per acre is about 1·40 tons. Compared with 62 tons in Hawaii and 56 tons in Java, the Indian average of sugar-cane per acre must be considered very low. Hardly less disheartening is the average of sugar per acre. The corresponding figure for Hawaii and Java is 6·4 tons. It is interesting to note in this connection that the *per capita* consumption of sugar in India is as low as 30 lbs. (of which gur alone accounts for 18 lbs.), compared with 112 lbs. in U.K., 114 lbs. in Australia, 115 lbs. in New Zealand and 128 lbs. in Denmark. With the improvement in the standard of living of Indian population internal demand for sugar is expected to be much increased, thus accelerating further development of sugar industry in India.

In spite of the phenomenal success achieved by Indian sugar industry in recent years, its production still falls far

Inadequate supply.



short of the country's demand. The production capacity of the mills is only 15.4 lakh tons and actual yield is still less, to be precise, 11 lakh tons, while the country requires 17.5 lakh tons on the basis of her present population of 357 million with *per capita* consumption of

11 lbs. Further more, this low internal demand is expected to shot up with a substantial reduction in the price of sugar, and the country possesses excellent opportunities for establishing external markets in the neighbouring countries. By 1956-57, internal demand of the country will rise upto 2 million tons even on the basis of the present per capita consumption.

Sugar Production Directly from Cane in Tons (Indian Union)

	1948-49	1949-50	1950-51	1951-52	1952-53
Names of States					
West Bengal	4,387	3,342	3,597	7,166	7,974
Bihar	1,85,110	2,22,352	2,25,147	2,23,978	2,72,759
Uttar Pradesh	5,45,264	5,08,155	5,92,262	8,33,953	6,99,749
Orissa	3,418	1,916	2,546	2,602	2,390
Punjab (India)	9,674	9,249	11,146	20,116	16,136
Madras	51,126	58,610	90,888	99,026	78,885
Bombay	1,13,002	1,11,225	1,21,519	1,57,796	1,38,814
Chief Commissioners'	5,479	5,090	4,252	4,470	—
States	18,874	11,465	8,759	18,098	7,487
Madhya Bharat Union	11,676	2,466	9,368	27,934	15,019
Pepsu	27,286	16,768	2,016	37,155	27,912
Mysore	8,199	3,016	1,543	7,454	579
Greater Rajasthan	21,261	19,756	24,223	38,952	42,902
Hyderabad United States of Travancore and Cochin	1,213	1,948	3,560	4,440	3,882
All India	10,05,969	9,75,358	11,00,821	14,83,160	13,14,488

Drawbacks
of the
industry.

The industry suffers from certain drawbacks which account for this low output and high cost of production. The seasonal character of the industry affects efficiency of the labourers, and reduction in the number of working days affects the production of the industry. Defective methods of production, waste in refining, waste of bye-products, poor output of sugar per ton of sugar-cane, and, lastly, high freight charges paid for transporting cane from fields to the factories, are some of the important causes that are responsible for low output and high cost of production which again accounts for the present low internal demand.

The price of sugar per maund has exorbitantly increased since the beginning of the Second World War. The following table shows that there has been an increase to the extent of 183·33 per cent.

Year	Average price per md.	Year	Average price per md.
1940	10 8	1945	16 4
1941	11 0	1946	20 14
1942	13 0	1947	35 7
1943	14 8	1948	28 8
1944	16 0	1949	28 8
		1950	29 12

Remedial
measures
suggested

The following measures have been recommended for removal of these defects.

1. Production units should be set up in or transferred to tropical areas.
2. Area of cultivation of sugarcane should be extended.
3. Yield per acre should be increased by introducing mechanised cultivation and large-scale use of fertilisers.
4. Sugar factories should be located in the neighbourhood of mills and, if practicable, mills should own plots of cultivation.
5. Growers of sugarcane should be organised into co-operative societies to eliminate middlemen.
6. In addition to fixation of minimum economic price, scheme of profit-sharing should be intro-

duced whereby the growers would be paid a percentage of the profit of the industry as an extra reward.

7. Arrangement should be made for preservation of sugarcane on modern scientific principles.
8. Bye-products of the industry should be properly utilised. Manufacturing power alcohol from molasses, card-board from bagasse and yeast from the waste will substantially reduce the overhead charges of the cost of production of sugar, thus bringing it within the reach of the poor countrymen and accelerating their demand for sugar. The industry possesses bright prospects of internal and external markets. Planned development of the industry on the line suggested above will help it attain its due prosperity in no distance future.

Paper Industry.—The age of Indian hand-made paper is as old as her civilisation, but the manufacture of machine-made paper dates from the beginning of the third quarter of the last century, when the first paper-mill was started at Bally on the river Hooghly in 1867. After that it was found that India had potentialities in this direction and so a mill at Titaghur in 24 Parganas of Bengal was started immediately after the establishment of Bally mill. Since then long time elapsed, but the progress of this industry scarcely kept pace with the number of years. The actual development of this industry dates from 1925, when the Bamboo Paper Industry Act (Protection) was passed.

Short
History.

At present there are 19 mills in India and their installed capacity is about 1,40,000 tons. The country's present demand has been estimated at 2 lakh tons, and there is a net deficit of about 1 lakh tons of paper of different varieties. This deficit is met by imports from Norway, Sweden, Finland, United Kingdom, Canada, the United States and Japan. The Paper Panel of the Advisory Planning Board estimated that by 1955-56 the home-demand for paper would rise upto 4 lakh tons and internal production should be increased to 3 lakh tons, so that imports from abroad

Production.

Imports.

Recommendations of the Planning Commission

could be further curtailed. With this end in view some of the old mills should increase their production capacity and new factories should be constructed. The following are some of the recommendations of the Planning Commission for development of the Paper Industry.

(1) New mills for manufacturing both paper and paper-board should be set up, preferably in the States of Assam, Uttar Pradesh, Vindhya Pradesh, East Punjab, Madhya Pradesh.

(2) Attempts should be made for manufacturing chemicals within the country.

(3) Transport facilities should be improved in the Himalayan provinces and lumbering industry should be promoted there.

(4) Forests with some specific trees should be kept reserved for the paper industry.

(5) Modern machineries of improved types should be introduced in the paper mills.

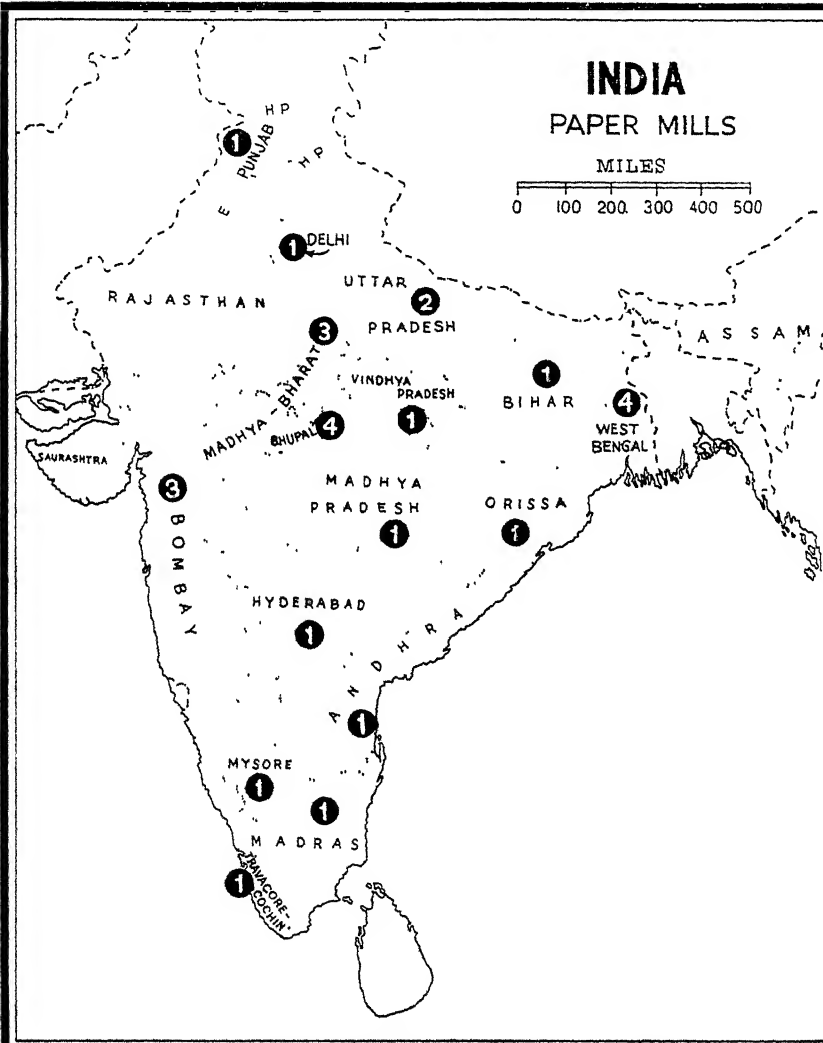
(6) The supply of raw materials such as bamboo, sabai-grass, etc. should be regulated and increased to meet the enhanced demand of the industry.

Distribution of factories. West Bengal is the principal centre of the Paper Industry in the Indian Union. The other centres are Lucknow and Shahrampur in U.P., Bombay, Poona and Ahmedabad in Bombay.

Distribution of Paper Mills in the Indian Union

States	Total Numbers	Location
West Bengal	5	Titagarh, Kankinara, Raniganj, Naihati, Tribeni.
Bombay	3	Lucknow and Saharanpur.
Uttar Pradesh	2	Bombay, Poona and Ahmedabad.
East Punjab	1	Jagdhari.
Mysore	1	Bhadravati.
Orissa	1	Brajrajnagar.
Andhra	1	Rajamundri.
Madras	1	Madras.
Hyderabad	1	Sirpur.
Travancore-Cochin	1	Punelur.
Madhya Pradesh	1	Ballavpur.
Bihar	1	Dalmianagar.
	19	

The West Bengal paper mills are the largest in India and account for more than 50 per cent of the country's total production. The West Bengal mills use bamboo and sabai-



grass as raw materials. Bamboo is obtained from Orissa, Assam and Asansol sub-division of the state itself while

sabai grass is procurable from U.P. and Madhya Pradesh. Straw, rags, scrap paper, bagasse, etc. are some of the raw materials used in Indian mills.

Availability of raw materials from the neighbouring states, nearness to coal mines, facilities for importing chemicals like caustic-soda, soda ash, bleaching powder, sulphur, sodium-sulphate, aluminium, sulphate and dyes through the port of Calcutta and intensive demand for paper within the state itself account for localisation of the paper industry in West Bengal.

Disadvantages.

Indian mills work under certain disadvantages. The necessary chemicals are not available in the country and have to be imported from abroad at high prices and carried to the mill areas at high transport charges. This enhances the cost of production. Secondly, so long most of the mills had to use coal as motive-power but the mills outside West Bengal and Bihar are located far away from the coal-mines, while raw materials are not available in abundance in coal mine areas. This accounts for the fact that the industry could not be developed in the states like East Punjab, Kashmir and Uttar Pradesh where raw materials of vegetable origin are plentiful. However, it is expected that development of hydro-electric projects in these states will obviate this difficulty to a great extent. Next important drawback of the industry is the scarcity of wood-pulp derived from soft-wood. Newsprint is manufactured from this wood-pulp. The present requirement of newsprint in the country is 60,000 tons and by 1956-57 the demand is estimated to rise upto 1 lakh tons. The country had to depend entirely upon foreign imports for this essential commodity. The National Newsprint and Paper Mills Ltd. (NEPA MILLS) in M.P. with a productive capacity of 30,000 tons is expected to meet 50 per cent of the country's present requirement. It may be mentioned in this connection that the country possesses spruce, pine and soft-wood trees in the inaccessible Himalayan regions. But these cannot be utilised for difficulties of transport. It is expected that with the improvement of transport facilities in these regions and development of hydro-electric power,

newsprint factories will be established there, preferably in Kashmir and the U.P.

The Paper Industry of India has a very bright future before it. The country possesses abundant raw materials and other facilities and internal demand for paper is very high. The internal market will be further widened with reduction in the cost of production and removal of illiteracy among the masses. Further, the surrounding countries are not at all advanced in this industry and Indian paper industry must explore suitability for finding outlet for its products. It is interesting to note in this connection that even with her present limited production India exports paper and other products of paper to her adjacent countries, viz., Pakistan, Burma, Ceylon, East Africa and Middle-East countries.

Future prospects.

Leather Industry.—Leather Industry in India ranks fifth in importance as a source of foreign exchange. This industry includes collection and curing of hides and skins, tanning, manufacture of leather footwear and leather goods besides footwear. India possesses a large supply of hides and skins. Indigenous tanning industry has been in existence within the country from a very long time, but the indigenous types of goods are not very popular now-a-days. The leather goods industry is mostly a small-scale or cottage industry. Indian Union produces, on an average, about 21 million hides and 41 million skins per annum. In India, unlike in most other hide-manufacturing countries, the production of slaughtered hides is unimportant. Nearly three quarters of the total annual output consists of "fallen" hides, i.e., those derived from animals that have died a natural death.

General Survey.

Although the industry on modern lines was started as early as 1860, it has not been able to make considerable progress because of caste prejudices, lack of proper training and want of capital and organisation. The Great World War of 1914-18, accelerated the progress of the industry. The industry was given protection in 1919. The protection failed considerably to achieve its object and so was abandoned in 1927. However the industry is progressing slowly.

Short History.

The number of large-scale organised tanneries in India is, however, small only about 26 in number, most of them located in U.P. The remainder is handled by small-scale tanneries which manufacture both vegetable-tanned and chrome-tanned leather scattered over the country.

The industry received further impetus during the Second World War due to large military demand for boots and shoes, harness, saddlery and other army equipments. The output of leather increased by more than seven times and the present output can be valued at over Rs. 25 crores.

Distribution of Tanneries. U.P., West Bengal, and Madras are overwhelmingly the largest producers. Madras is the largest producer of buffalo hides and sheep skins, and U.P. is the largest producer of goat skins followed by West Bengal and Bihar.

Large Scale Tanneries in India

State	No. of Tanneries		No. of Tanneries.
U. P.	16	Bombay	1
W. Bengal	3	Mysore	1
Madras	3	Pepsu	1
Bihar	1		

India supplies about 30 per cent of the goat-skins of the world, and Indian goat-skins are considered to be the best raw materials for high class kid. In recent years, India has been exporting lamb and kid and India's fur-skins have been playing an important role in international commerce. Kanpur, Agra, Delhi and Calcutta in N. India and Madras in S. India are the important centres of this industry. Abundant supply of hides and skins and nearness of good water, supplies of chemicals, and plentiful supplies of tanning materials like *babul* bark and myrobalans are the principal factors for influencing localisation of leather industry.

Utility. By far the largest utilisation of leather is in the production of footwear. The small-scale and cottage industry section of the footwear industry is mainly located in Agra, while Bombay and Calcutta have specialised in the machine-made section. Batanagar, near Calcutta, manu-

factures footwear on a very large scale. Chrome process has been introduced and much improved in Madras.

India exports annually leather valued at over Rs. 25 crores, the most important item being tanned or dressed cow-hides which alone account for about 35 per cent of the total exports. The United Kingdom is the largest importer of Indian hides and skins, taking about 50 per cent of the country's exports and the U.S.A. comes second with about 30 per cent. Exports.

The internal demand for footwear and other leather products are progressively increasing. There has also been an increase in the export of tanned leather and leather goods. So the industry may well look forward to a bright future. The following measures are recommended for adoption to set the industry on sound footing :— Future of the industry.

(1) Institutions should be set up for educating the people in the modern tanning principles. It may be noted in this connection that the Tanning Institutes of West Bengal, Jullundhar, Bombay, and Madras have made schemes for imparting the science of modern tanning technology to the youngmen of the country.

(2) System of procuring raw materials should be improved and regulated.

(3) State-aid should be extended to the small-scale and cottage section of this industry and members of this section should be encouraged to form themselves into co-operative societies.

Chemical Industry.—The Chemical industry is one of the most vital key industries of a country, as it plays a very important part not only in the industrial advancement and economic life but also in the national defence of a country. Heavy chemicals, especially sulphuric and hydrochloric acids, lime, caustic soda, sodium, carbonate, nitric acid, etc., are the essential requisites for many industries. So far the Indian Chemical Industries have shown indifferent progress, although supply of raw materials for some of the heavy chemicals is not lacking in the country. Sulphide

Present
position
of the
industry.

ores, saltpetre, alum salts, limestone, magnesium, etc. are available in considerable quantities. The Indian Fine Chemical industry is still in its infancy, and its further development is hindered by the high cost of intermediates of which there is no local production. Due to under-development of this branch of the Chemical Industry, the manufacture of drugs and medicines, germicides and similar products is also not prosperous. There is considerable production of tinctures, liver extract and shark liver oil. Quinine and Quinine salts are manufactured in state-owned plants in Madras and West Bengal from the bark of cinchona trees. Penicillin plants have been set up in Bombay for bottling imported penicillin. The Government of India have entered into an agreement with *WHO* and *UNICEF* for construction of a plant in Bombay for manufacturing penicillin.

The impetus given by the War and by the constantly increasing demands of the local industries has made India self-sufficient in a variety of heavy chemicals like liquid chlorine, bleaching powder, nitric acid, hydrochloric and sulphuric acids, and magnesium sulphate, while there is an exportable surplus of calcium and magnesium chloride, sodium and potassium, etc.

India is rich in raw materials for heavy chemicals such as salt, limestone, gypsum, bauxite, zircon, ilmenite, beryl, monazite, chaolin, etc. which are available in abundance. The Indian chemical industry is seriously handicapped by deficiency in coal. Except West Bengal, all other important centres of this industry such as Agra, Delhi, Kanpur, Bombay and Madras suffer from shortage of coal. However, it is expected that with the completion of the present hydro-electric schemes, the progress of the chemical industry in these areas will be much accelerated.

The products of the chemical industry are essential for manufacture of soap, leather, glass, paints and varnishes, rubber, drugs, etc. The importance of heavy chemicals lies in the fact that they are essential for development of industries like textile, leather, paper, etc.

In recent years both the heavy chemical and the fine chemical industries have made remarkable progress. The country now manufactures sulphur and its compounds, caustic soda and bleaching powder in sufficient quantities. But the home production is still inadequate to meet the country's demand. In the pre-war period, in the matter of heavy chemicals India had to face keen competition from foreign countries, like Germany and the United Kingdom. Shortage of certain raw materials like sulphur, potassium compounds, sulphate of ammonia, etc., lack of enterprise, want of special types of plants, etc., are the causes of poor progress of this industry. This industry has been enjoying protection since 1931. The Second World War improved the outlook for this industry. The stoppage of imports from abroad, especially from Germany, and the intense war demand for chemicals gave a great push to this industry. New plants have been established and existing factories have expanded their operations considerably. The Board of Scientific and Industrial Research is engaged in many research schemes. Yet, in spite of the best efforts, the country is experiencing a chemical famine and a large number of industries are seriously affected by shortage in supplies of essential chemicals.

Future
of the
industry.

The country has yet to depend heavily on imports of chemicals from abroad. In 1948-49 India imported chemicals valued at Rs. 29 crores and her imports in 1952-53 amounted to Rs. 24.86 crores. The principal exporting countries are the United Kingdom, the United States, Western Germany, France, Italy and Japan.

Imports
from
abroad.

Sindri Fertilizer Factory.—One great problem of Indian agriculture is the low agricultural productivity. This is, to no less extent, due to the failure of our agriculturists to apply sufficient fertilizers to their land. India requires huge quantity of ammonium sulphate and super phosphate for use as manures. But so long there was no arrangement for manufacturing these two useful fertilizers in India and the country had to depend entirely upon imports from foreign countries. Cost of imported manures was very high. Recently organisations have been set up in the States

Production
of fertili-
zers.

of Bihar, Mysore and Travancore-Cochin for manufacturing ammonium sulphate.

The Sindri Fertilizer Factory has been founded by the Government of India at Sindri near Jharia in Bihar. The productive capacity of this factory will be 3·5 lakh tons. In 1952 about 1·5 lakh tons of ammonium sulphate were manufactured in this factory.

Possibilities.

Gypsum is the principal raw material of this industry. India is rich in this mineral product. The Sindri factory obtains its raw material from the mines of Rajasthan. It is expected that with full exploitation of the productive capacity of the Sindri Fertilizer Factory, India will attain self-sufficiency in this very useful material, and, thus, the country's agricultural production will be further stepped up.

General Survey.

Match Industry.—The Indian match industry is of very recent origin and practically dates back to 1921 when a protective duty was imposed upon imports from foreign countries. There were some abortive attempts, before this date, for manufacture of matches in India, but all these failed with the only exception of the Gujerat Islamic Match Factory which was founded in Ahmedabad in 1895 and which still survives. The industry has made much headway with the imposition of the protective import duty, and there are prospects of considerable further expansion.

Supply of raw materials.

Soft wood and chemicals are the two principal ingredients of this industry and the expansion of the industry is dependent upon adequate supply of soft wood. India is rich in this type of wood, considerable supplies of which come from Andaman Islands. Sulphur and phosphorus are imported from outside. The internal demand for products of this industry is considerably high. So the industry can hopefully look to a prosperous future.

Production.

There are at present 117 match factories in the Indian Union. The factories are located in Assam, West Bengal, Gwalior, Hyderabad, Mysore, U.P., Bombay and Madras. The noted Swedish Company, Western India Match Company Limited, founded a chain of factories in different

places of India, such as Calcutta, Madras, Bareilly and Ambernath, to avoid the burden of protective duty and this company enjoys virtual monopoly of match production in this country.

Production of Matches in the Indian Union
(in lakh gross boxes)

1946	25,5	1950	26,4
1948	31,9	1952	31,9

At present India does not import any matches from abroad ; on the contrary, some quantities are exported to the neighbouring countries.

Glass Industry.—The manufacture of glasswares by indigenous method in small-scale has been in practice in India for a long time. But our indigenous products could not stand in competition with imported materials of improved quality. Imports from Germany, Belgium, England and Czechoslovakia inundated the Indian market. The growth of the glass industry on modern scientific lines dates from 1908 when the premier glass factory, the Paisa Fund Glass Works, was started at Telegaon in Bombay. The First World War of 1914-18 gave great impetus to the industry as imports practically stopped during this period. Since then the glass industry of India has achieved phenomenal progress.

The organisation of glass industry in the Indian Union is divided into two sections :

(1) indigenous cottage industry and (2) the modern factory industry. The modern factory industry is engaged in manufacturing glass cakes and sheets and various other classes of finished goods, such as, beads, bottles, lamps, phials and surgical and laboratory requirements ; while the indigenous industry has confined itself to the manufacture of rough products like bangles and other ornaments on small scale.

There are at present 131 glass factories in the Indian Union. The factories are scattered all over the country.

Statewise
distribution
of factories.

Distribution of Glass Factories in the Indian Union

West Bengal	34	East Punjab	7
Bombay	32	Madras	4
Uttar Pradesh	24	Delhi	3
Bihar	8	Orissa	1
Madhya Pradesh	6	Other States	12

Glass sheets are manufactured in only five of these factories, while nineteen factories have specialised in the manufacture of surgical and laboratory implements of special types. West Bengal, Bombay and Uttar Pradesh are the principal centres of this industry. The Uttar Pradesh has specialised in the manufacture of bangles, glass sheets and hallow and pressed wares. Availability of sand, potash, nitrate and lime and of skilled workers within the State and nearness to the coalfields of Bihar have contributed to the success of this industry in this State. But the cottage industry system still predominates here, and the industry is not properly organised and sufficiently modernised. Faizabad, Moradabad, Naini and Hathras in the U.P. are the important centres of this industry. Lamp-ware, laboratory and surgical implements, and glass phials of superior quality are manufactured in the factories of Bombay and West Bengal. Amritsar and Ambala are the two principal centres in the East Punjab.

Future
of the
industry.

Sand, potash, lime, salt, borax, dolomite, sulphur and saltpetre are the important raw materials used in this industry. Sand, dolomite, saltpetre and limestone are available in plenty in different parts of the country. Only borax and sufficient quantities of soda ash are not obtainable in India and have to be imported from U.K. and the U.S.A. Coal and skilled labour also may be had in abundance. The industry enjoys good internal and external markets. So the future of the glass industry is quite bright. India exports glass and glasswares of the value of Rs. 15 lakhs. Improvement in the quality of her products and a reduction in their cost will appreciably help in expanding her foreign market for the products of the glass industry.

Lac Industry.—Lac industry is practically a monopoly of India. Upto the period of the Second World War India

supplied more than 90 per cent of the world requirement of lac. The remaining 10 per cent was supplied by Burma, Thailand and Indo-China.

Lac is used in a number of industries like the manufacture of gramophone records, electrical, paint and varnish industries. It is also widely used in the manufacture of sealing-wax, photographic materials, bangles, toys, munitions and fireworks. Lac dyes have lost much in importance because of the discovery of aniline dyes. Lac is now principally used for manufacturing shellac.

Lac is produced in Bihar, Orissa, Madhya Pradesh, West Bengal, Uttar Pradesh and Assam. More than 50 per cent of the total production of the country is obtained from the Chotanagpur division of Bihar. Lac is produced from the secretion of a class of insects known as *Laccifer Lacca* Production. which live on the juices of certain trees like Palas, Kusum, Ber, Ghost and Arhar. In India about 40 per cent of the total production of lac is used in the manufacture of gramophone records, another 35 per cent is consumed by electrical, paint and varnish industries and the remaining 25 per cent is used in other industries.

About 95 per cent. of the total production of the country is exported outside. The principal buyers are the Exports. U.S.A., Germany and Japan.

Percentage of Export of Lac to Foreign Countries

U. S. A.	..	..	..	50
U. K.	..	..	..	15
Japan	..	..	..	27
Germany		..	..	5
Other countries		..	..	3
				<hr/>
				100

Problems
facing
the lac
industry.

India had so long enjoyed an unrivalled position in the export trade of lac. But her exclusive command in this trade has, of late, been threatened by some other south-east Asiatic countries like Thailand, Indo-China and Burma. In the past India had monopoly in the refining of raw lac into shellac and seedlac and the other producing countries used to send their raw lac to India for refining process. But Thailand has been seriously challenging India's position as the exporter of refined lac. She has much increased her production and has started sending her raw lac to the U.S.A. for being processed there. India is facing another problem in this respect. Introduction and growing use of synthetic products like bakelite in electrical goods industry and cellulose preparations in the varnish trade are threatening the secured position of India in the export trade in lac. Intensive scientific researches should be carried on to devise other uses to which lac may be put. The Indian Lac Research Institute at Nankum in the district of Ranchi in Bihar has been founded for conducting such scientific researches.

The
need for
merchant
marine
in India.

The Ship-building Industry.—India has a large volume of international, coastal and internal trade and she requires a large number of ships for the *carriage of her coastal and overseas trade as well as for traffic in inland waterways*. The volume of her sea-borne and coastal trade is more than 25 million tons of cargo and a quarter million passengers and 17 million tons of cargo and 2 million passengers respectively. This huge overseas and coastal traffic is handled and controlled by foreign companies. Moreover, the country is surrounded by seas on three sides and she *needs her own ships for the defence of her coasts*.

Present
position
of the
industry.

India possesses sufficient raw materials for this industry. Steel, timber and coal, the three principal raw materials, are available in plenty, steel from the iron and steel factories of Bihar, West Bengal and Mysore, timber from Chotanagpur and Madhya Pradesh and coal from the Gondwana coalfields. The other necessary requisites for the ship-building industry are ship-building and repairing yards, good harbours and supply of labour, skilled and

unskilled. India possesses certain repairing yards in Calcutta and Vizagapatam. There are also a few dry docks in Calcutta. The existing ship-repairing yards may be conveniently used for ship-building purpose. The harbours in India are also not at all unfit for this purpose. The back-water at Cochin and places like Uluberia and Rajganj near Calcutta where sufficient depths of water are available offers excellent sites for ship-building and repairing yards. Further, ship-building is a very ancient industry of India and in the early period of the British rule in India, the industry attained such pre-eminence that at one time it seriously threatened the existence and development of the the ship-building industry of Great Britain. The dexterity of Indian workers engaged in this industry compared much more favourably with that of the labourers in any other part of the world. Even today there will be no dearth of efficient labourers in India ; on the contrary, the establishment of this industry will go a long way to solve the unemployment problem in the country. Thus it is evident that there is a great deal of scope and opportunity for the development of this industry in the Indian Union. The indifferent and obstructive attitude of the alien rulers in the past had been responsible, to a great extent, for the undeveloped state of this 'key industry' and for our absolute dependence upon foreigners in this respect. This also accounted for huge annual drainage of our resources. But development of this industry is essential for building effective defence and advancement of trade, both inland and foreign.

The share of Indian shipping in her large sea-borne and coastal trade was only 2 per cent and 25 per cent respectively in 1949-50. The Indian Mercantile Marine Committee *recommended the grant of bounties and for the establishment of a ship-building industry in India* nearly 30 years ago. No action was, however, taken on these recommendations. The last war gave a great stimulus to this industry, but the Government of India did not take any vigorous action in this direction. It is only after the attainment of independence that the active attention of our Government has been drawn to this industry. The Shipp-

ing Policy Committee (1947) had recommended that the target for the subsequent 5 to 7 years should be a total tonnage of 2 millions.

Registered tonnage of India

1946	1950
127,088	377,500

Calcutta.

Vizag
yard.

Calcutta possesses natural advantages for the establishment of a ship-building yard. It is in close proximity to steel centres of Bihar and West Bengal which can supply ship-building materials, and in the initial stage machineries may be imported from abroad through the port of Calcutta. Calcutta is well connected with the coalfields by roads and railways. Timber may be obtained from the Sundarban areas and sufficient depths of water are available near Calcutta. There is a plentiful supply of efficient labourers. Banking and credit facilities are the most well-developed here and there will be no dearth of capital. Calcutta enjoys an additional advantage of being situated in the midst of a highly developed mechanical engineering industry. The Scindia Steam Navigation Company, the pioneer shipping and ship-building company of India, in fitness of things, proposed to open a ship-building yard in Calcutta. But being unable to obtain a site here, the promoters opened the yard at Vizagapatam. The building of medium-sized ocean-going vessels has been started there, and already a number of 8000 tonners have been turned out from this yard.

Vizagapatam also possesses certain geographical and economic advantages. Vizagapatam possesses a fine land-locked harbour with sufficient depth of water for the launching of large vessels. The port is situated between Calcutta and Madras and thus it is convenient to bring necessary raw materials from these two ports by means of sea carriage. Coal and iron-ore are within easy reach of this port. It is well connected with M.P. and Chotanagpur wherefrom timber, necessary for making docks, cabins, etc., can be obtained. Cheap labour is available in the locality.

In short, the port is ideally suited for being used as a ship-building base. At present it is the only ship-yard in India designed and equipped for building sea-going vessels. This yard, when fully developed and equipped, would be capable of building 16 ships annually at internationally competitive prices.

The other two major ports of India, namely, Bombay and Madras, suffer from certain disadvantages. Bombay is far away from the coalfields and iron centres. The harbour of Madras is artificial and the sea is shallow there. Further, both these ports are too congested to have spacious areas for the purpose.

Automobile Industry.—There are at present over 3 lakhs of automobiles of all descriptions in use in India. The estimated annual import of these automobiles is about Rs. 20 crores. This causes a heavy drain on the country's hard-pressed foreign exchange. Even then, the number of automobiles, specially cars and trucks used in India, is quite insignificant in consideration of the vast size and large population of the country.

General
Survey.

Automobiles in some important countries of the world

		No. of automobiles (in millions)	Average No. of persons served by one motor car.
U. S. A.	..	52.00	4
U. K.	..	3.31	18
Canada	..	2.30	8
France	..	2	18
India	..	.30	1900

This backward state of affair is due mainly to the appalling poverty of the people, prohibitive cost of the imported automobiles and also to the unsatisfactory state of the road transport system. India possesses fair prospects for the development of an automobile industry. Her population is very high and with the increase in the per

Prospects.

capita income and improvement and expansion of her road mileage and reduction in the cost of production, the industry can be assured of a very prospective internal market. Iron and steel products, non-ferrous metals and alloys, rubber products, leather and textile goods, motive power, efficient and cheap labour, sufficient capital, etc., are some of the essential requirements of the automobile industry. Most of the raw materials listed above may be had in abundance within the country. India has a progressively increasing home market. As regards iron and steel, aluminium, plywood, and other raw materials the country suffers from no shortage. Coal and hydro-electricity can furnish required motive powers for the industry. Complex machineries and skilled technicians may have to be brought from foreign countries in the initial stage, but it can be safely said that our workers will achieve the standard of skill required after a few years of experience.

Distribu-
tion.

There are at present twelve assembly plants in the Indian Union—three in West Bengal, three in Madras and six in Bombay. India does not manufacture all the parts and accessories used in building up automobiles, but Indian Units are now engaged in assembling imported components. The automobile industry in all other parts of the world prefers to confine its business to manufacturing component parts and assembling them. Indian automobile industry expects to manufacture *seventy-five per cent* of the component parts in the near future, and at least five of the existing Indian Units have bold plans for the manufacture of all the parts in their own factories.

W. Bengal.

The Hindusthan Motors Limited at Konnagar in West Bengal was started in 1944. The Company is linked up with two other world-renowned automobile factories, one of Morris Motors of England and the other of the U.S.A. The factory is ideally situated, enjoying the facility of the port of Calcutta for importing machineries and component parts from abroad. It is connected by railways with the iron and steel centres of Bihar and West Bengal and obtains necessary rubber products from the Dunlop Rubber Company of West Bengal. It also enjoys the brisk local demand of

West Bengal and other neighbouring states. The present production capacity of this factory is about 19000 units.

The second most important factory, the Premier Automobiles Limited of Bombay was also started in 1944. This company works in collaboration with the Chrysler Group of U.S.A. and is engaged in the manufacture of cars and trucks. The factory enjoys the facility of the port of Bombay and is run on cheap hydro-electricity. But it suffers from the disadvantage of its long distance from the iron and steel and rubber factories. The Premier Automobiles has an assembling capacity of 12000 units per year.

Asansol, Jamshedpur and Vizagapatam are the other sites suitable for location of this industry. These are either near or in the heart of iron centres, can obtain coal from Gondwana fields in the vicinity, can conveniently use Calcutta or Vizagapatam as ports for importing parts and machines and can have supply of trained labour and various component parts from the well-developed engineering industries of West Bengal and Bihar.

Production of Automobiles in the Indian Union

1949-50	1950-51	1951-52
18,135	16,519	23,576

A sad commentary on India's economic and industrial backwardness is that an important unit whose capacity is about 8 vehicles an hour should have over 80% of its capacity rotting in enforced idleness and that a country of 360 millions should absorb the lowest annual quota of automobiles not exceeding 6000. It may be seen from the above figures that the full productive capacity of the Indian factories is not utilised and this forced idleness causes adverse effect on the working of the factories and enhances the cost of production of the automobiles assembled there. This is due, it is said, to the limited demand of the local market. This may be remedied by making plans for manufacturing pistons, cylinder liners, valve guides, tractors and other agricultural implements in the automobile factories of the country.

Future.

So long as the automobiles industry of the country is not sufficiently developed to manufacture automobiles of all descriptions of superior quality, to place them in the market at competitive prices and meet the entire local demand, our imports from foreign countries like U.K., U.S.A., France, Italy, etc. will continue. The industry possesses bright position of internal and external markets. The country possesses almost all the raw materials in abundance. The attitude of the Government is sympathetic and helpful. There is no reason why the industry should not develop to the desired extent.

The need
for a
national
aircraft
industry.

Aircraft Industry.—For the unification of huge land areas like India, the development of air transport is an indispensable necessity. Apart from military and defence requirements, the possibility of civil aviation in India is very great. The vast size of the country certain parts of which are still inaccessible by any other means of communication, her fine weather conditions with excellent visibility and the country's strategic position in world air-routes—all these factors point to the importance of India's having well-developed air-lines. If air-transport in India is not quite as popular as in some other parts of the world, it is because of very high cost of transport by airways, and it is expected that it would gain in popularity as a means of transporting both passengers and commodities with substantial reduction in the cost. The last great war gave great stimulus to air-transport and now it is extensively used by the Government of the country for carrying mails, for sending relief, food and medical aid to areas affected by any natural calamity like flood, by the manufacturers and traders for quick despatch of their wares, specially if these are of perishable nature, and, lastly, by the public for quick and comfortable journey. Importance of well-developed air-lines during war in a country like India with far-flung frontiers can hardly be exaggerated. So for facilities of trade and transport, for maintenance of law and order and for effective defence of the country's frontiers in case of any aggression, it is essential that the country must own a large number of aircrafts of various sizes and designs. But to increase the number of aircrafts by purchasing from foreign

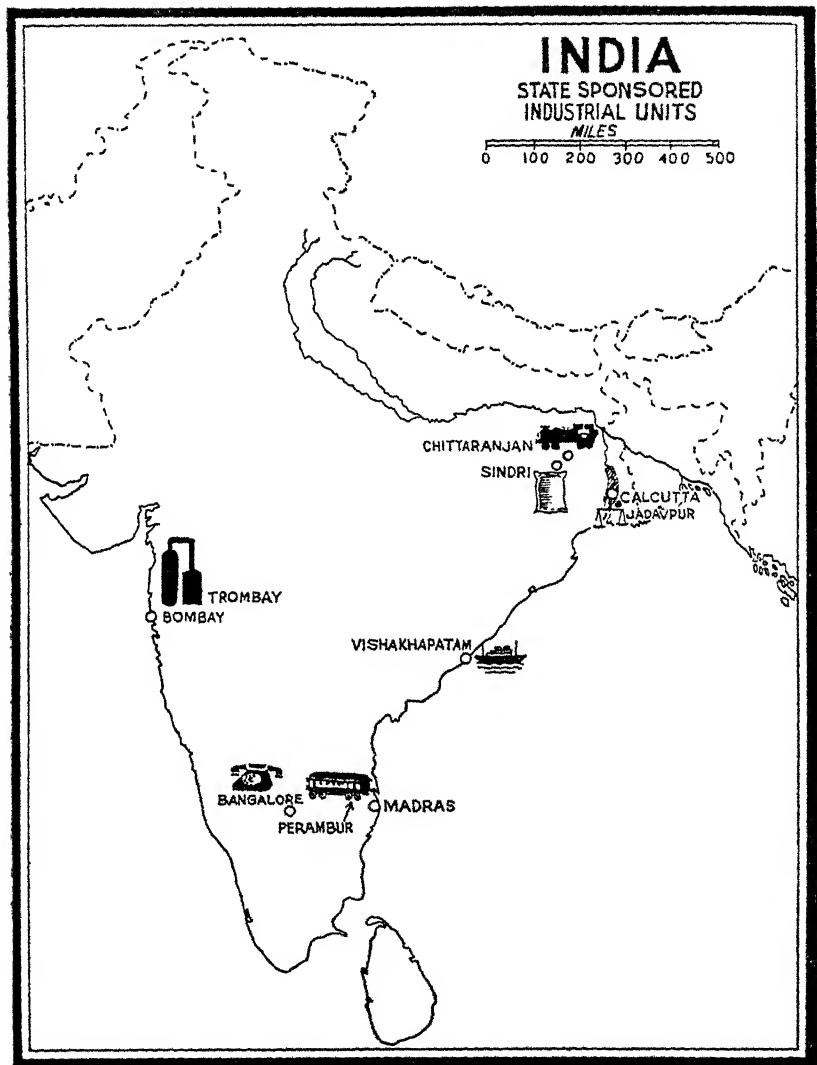
countries is not wholly a commendable measure as it involves India's absolute dependence upon foreign countries and huge drainage of the country's resources. Further, the country must possess organisations for carrying on repair works. Almost all the essential pre-requisites for development of the aircrafts industry are found in India. Hence the conditions of the country demand that the industry for manufacturing aircrafts should be developed in India. It is a happy augury that the Government of the country is not indifferent to the development of this industry, and since the country attained independence, much progress has been made in this direction.

The following are the essential pre-requisites for the development of aircraft industry :—

- | | |
|-----------------------|-------------------------|
| (1) Cheap power. | (4) Rubber products. |
| (2) Steel products. | (5) Efficient labour. |
| (3) Aluminium sheets. | (6) Sufficient capital. |

There is no dearth of cheap power. The country is rich in coal resources and completion of the already launched hydro-electric projects will substantially augment cheap power resources of the country. Aluminium sheet, steel and rubber-products may be had in sufficient quantities. With the contemplated development of the iron and steel industry and manufacture of rubber-products and with the completion of the river-projects, supply of these essential commodities in required quantities may be assured. India enjoys a very genial climate suitable for aviation and for testing engines. There will be no paucity of fund for furnishing necessary capital as the government of the country has undertaken the responsibility of developing this industry. Capital and technical assistance may also be obtained from foreign sources. In the initial stage our youngmen who have amply proved their mettle in many other fields, may be sent to foreign countries for training in the art of manufacturing aircrafts. So, ultimately, there will be no scarcity of efficient labour too. Thus, it may be said that the country possesses all the potentialities for development of this important industry.

Possibilities of the industry.



The Scindia Steam Navigation Company Limited of India submitted a proposal in 1939 for the manufacture of aircrafts in India, but this proposal was turned down by the then government of the country. Two years later, the changed course of the war forced the government to change

its views, and, accordingly, in 1941, an aircraft manufacturing factory, The Hindusthan Aircraft Limited, was floated in Bangalore as a commercial enterprise, and the capital of the Company was held jointly by the Government of India, the Mysore Government and Mr. Walchand Hira-chand of Scindia Steam Navigation Company and his associates. Afterwards the Government of India took it over for the improvement of production and management. The factory was designed to be an assembly plant from imported components. Recently the Government of the Indian Union have entered into an *Assistance Agreement* with Messrs. Percival Prentice Trainers Company of London for supply of 50 aircrafts to India. Of these aircrafts 20 will be manufactured in London with raw materials procured from there, and the remaining 30 aircrafts will be manufactured in India in co-operation with the Hindusthan Aircraft Corporation of Bangalore and the available raw materials of the country will be utilised in their manufacture and our workers will be given every opportunity to learn the mechanism of the industry.

Present position.

Bangalore in Mysore State has been selected for the erection of the first aircraft factory in India because of certain advantages attached to this site. The place enjoys nearness to raw materials and motive power. It enjoys an equable climate and a central situation as also remoteness from the sea-coast. Steel products may conveniently be obtained from Bhadravati Steel Works, aluminium may be procured from the Indian Aluminium Company at Alwaye in Travancore-Cochin, and Mysore Hydro-electric Works can supply hydro-electric at cheap rates. The site further enjoys the benefits of the Science Institute established at Bangalore. In short, Bangalore is an ideal place for aircraft manufacture.

But the ever-increasing demands of the country cannot be met by a single factory and as such, there is the need for establishing similar factories at other suitable places. In this connection the claim of Asansol in West Bengal, Jamshedpur in Bihar and Katni in Madyha Pradesh may be considered. All these places are situated in the centre

Other sites.

or vicinity of the sources of raw materials such as, steel products and aluminium sheet, enjoy nearness to fuel, equable climate and plentiful supply of labour. Asansol also enjoys the facility of the port of Calcutta.

The Locomotive Industry.—In 1952, the total railway mileage in India was estimated at 34,123 miles. They spread all over the country in the form of a network. The railway is the most important system of transport in the Indian union. The Indian Railways require a large number of locomotives. In the past locomotives were imported from the United Kingdom, Germany, the U.S.A., and Canada, and India was entirely dependent on foreign countries for locomotives.

To remedy this state of affairs, the Government of India established a locomotive factory at Chittaranjan in the district of Burdwan in West Bengal in 1950. This factory, known as the Chittaranjan Locomotive Works, is owned and managed by the Government of India. The factory is located in the heart of the coal-bearing areas. Iron and steel is obtained from the ISCO (Burnpur & Kulti), and the TISCO (Jamshedpur). It is situated on the main line of the Eastern Ry. and is very near Calcutta. The place is healthy, open and has sufficient accommodation. The factory employs about 6000 persons. The factory completed the manufacture of the first 100 locomotives in January 1954. The eventual target of production is 120 locomotives and 50 spare boilers a year. The second locomotive factory is Tata Locomotive Engineering Co., situated at Tatanagar. It has easy access to steel and fuel. It is scheduled to produce 50 locomotives and 30 spare boiler's per year from 1955-56.

But these factories have not yet been able to manufacture all the component parts. Some of the component parts such as boiler tubes, large and complex steel castings and some other patented parts have to be imported from abroad. At present, the imported components and the parts manufactured in these factories are being assembled. The locomotives manufactured have been put in operation and their services are quite satisfactory. With the expansion of

this industry, more steel production is also needed and want of skilled workers is also a handicap. More workers should be trained in this line.

During the period of the First Five Year Plan, 268 locomotives are expected to be manufactured by the Chittaranjan Works and 170 locomotives by the TELCO. Nevertheless, it is estimated that the Railways will have to import 641 locomotives. Again the demand for locomotives is expected to increase with the increase of trade and commerce and the betterment of the economic condition of the country. So the country must have more workshops for manufacturing and repairing locomotives at suitable places to do away with this dependence on foreign imports.

The Cement Industry.—Cement is an indispensable commodity for construction of buildings, roads, bridges and dams and its usefulness has much increased in recent times when the country has launched upon an extensive programme of house-building and an ambitious plan of river-projects. Although the present demand for cement exceeds 4 million tons, actual production in 1952-53 was about 3·4 million tons. The cement industry occupied an insignificant position upto 1914. The country had to depend mainly on imported cement. But the industry has made rapid strides during the last forty years. The country has now become almost self-sufficient in this respect. In view of the increased production of cement by the Indian factories, the Government of India decided in 1949 to restrict import from foreign countries. There are practically no imports now and the quality of Indian cement is not inferior to foreign products.

General
Survey.

Limestone, gypsum, alluvium and carbon-shoot are the important raw materials of the cement industry. India enjoys abundant supply of these raw materials, mostly of excellent quality, occurring in close proximity to railway lines. But the industry labours under a great handicap. Most of the factories are located at great distance from the coalfields. The high cost of transporting coal to the factories enhances the cost of production.

Raw
materials
needed

Present position. There are at present 23 cement factories, distributed all over India with a total capacity of production estimated at 3·88 million tons.

Distribution of Cement Factories in the Indian Union

Bihar	3 Madhya Pradesh	3
Hyderabad	1 Bombay	3
Uttar Pradesh	1 East Punjab	2
Orissa	1 Madras	4
Andhra	1 Pepsu	2
Mysore	1 Assam	1

There is no cement factory in West Bengal. Internal demand for cement in this state is very high. But deficiency in the two principal raw materials, namely, gypsum and limestone, account for the absence of any cement factory in this state. The cement factory in Orissa is partly owned and managed by the State Government. The proposed factory in U.P. to be financed and managed by the government of the State, will have the highest productive capacity and will go a great way in meeting the internal demand of the country.

The production of cement in the Indian Union has steadily increased during the last several years, resulting in gradually reduced imports from abroad.

Production and Import of Cement

	(million tons)	
	Production	Imports
1948-49	1·62	·38
1949-50	2·23	·37
1950-51	2·81	·02
1951-52	3·29	—

The country's demand for cement is progressively increasing, but due to increased production, there has been an appreciable fall in imports. The Planning Commission

have estimated that by 1955-56, India's consumption of cement would rise upto 4·5 million tons and they have accordingly suggested that the production should also be stepped upto 4·8 million tons by that time, so that the country would attain complete self-sufficiency in this material and would have a surplus of ·3 million tons to be exported to Pakistan, Ceylon and Middle East and East African countries. To achieve this desired increase in the production, they recommended establishment of more factories and expansion of the present capacity of some of the existing factories. Prospects.

The mal-distribution of the factories, their distance from the sources of raw materials and from consuming markets, and consequent high cost of production, unsatisfactory system of transport, absence of any organisation for manufacturing machineries for cement factories, high packing charges, scarcity of cheap motive power—these are some of the glaring defects of the industry. Problems of the industry. Erection of new units on planned basis, development in the system of transport and completion of the river projects are expected to remove these defects and place the industry on a sound footing. Simultaneously attempts should be made to develop export trade in cement in the adjacent countries by entering into bilateral trade pacts, if necessary.

It may be concluded that the industry commands a bright future and the pace of its present progress is quite satisfactory.

The Rayon Industry.—Rayon or artificial silk is produced from soft-wood. Caustic soda, ammonium sulphate, bleaching powder, etc. are some of the important chemicals required for making cellulose pulp from soft wood or cotton. Present position. Yarns are manufactured from these pulps and are finally woven into fabrics. Availability of soft wood, necessary chemicals and the particular type of machineries influence the growth and development of this industry in a country. The Indian Union possesses soft-wood in abundance, but the scarcity of chemicals and machineries has been retarding the progress of the rayon industry in India. There is a great demand for artificial silk in this country. India

imports a large quantity of artificial silk from Japan, Italy, the U.K. and France. A considerable portion of her imports consists of rayon yarn which is manufactured into piece goods within the country.

Future
of the
industry.

The manufacture of rayon from 'fibro', a product obtained from grass and bamboo pulps and increased use of cheap hydro-electricity, installation of modern machineries and lastly manufacture of necessary chemicals within the country will substantially reduce the cost of production and improve the supply of this popular fabric. The rayon industry has already assumed great importance, next only to cotton industry. The future of this industry is brighter still.

Cottage Industries

Cottage
industries
in India.

Cottage industries are carried on in the home of the workers themselves with hand-operated appliances. They have been in existence in India since times immemorial. "At a time when the rest of Europe, the birth place of the modern industrial system, was inhabited by uncivilised tribes, India was famous for the wealth of her rulers and for the high artistic skill of her craftsmen." The cottage workers of India used to produce variety of articles of very high quality. Cotton, woollen and silk textiles, brass and metal wares, steel products, leather goods, paper, perfumery, glass-wares and jewellery, to name only a few, were some of the better known products of these cottage industries. Some of these products, such as Muslins of Dacca had attained the highest perfection of craftsmanship and enjoyed international reputation. These cottage industries were carried on hereditary basis and their products were in high demand in different parts of the world.

Causes of
decline.

From very early days upto the introduction of large-scale industries with power-operated machineries, the cottage industries were supplying the people with all their requirements of manufactured goods. But, at present, most of the cottage industries of India are in a decaying condition. The causes of decay may be enumerated as follows :—

(1) *Disappearance of Courts* : The Indian princes, Rajas and Nawabs and the nobility attached to their Courts were the great patrons of the cottage workers and with their gradual disappearance, the production of the cottage industries have lost much in demand and, consequently, the handicraftsmen have been forced to change their occupation in course of time.

(2) *Competition of cheap machine-made goods* : Since the Industrial Revolution in England, English producers have started manufacturing articles in large quantities and at very low costs. Import of these cheap machine-made goods into this country, without let or hindrance, caused the destruction of many cottage industries.

(3) *Indifference of the alien rulers* : The selfish commercial policy of The East India Company and the successor government in India, encouraging the rising manufactures of England, rendering India subservient to the industries of Great Britain and making the Indian people grow raw materials only, succeeded in suppressing the Indian cottage industries.

(4) *Change in the habits and tastes of the Indian people*. The imitation of European ways of life by the richer classes and consequent preference for imported articles was, to no small extent, responsible for gradual decay of the Indian cottage industries.

There is a need for reviving these small industries. Under the present primitive method of cultivation, the people remain engaged in agriculture for six to eight months, and for the rest of the year, they have to be engaged in some cottage industries. The progress of modern large-scale industry, however, rapid, cannot possibly give full employment to the vast population of India. So, for the solution of unemployment problem in rural areas and also for supplementing the meagre income of the peasantry, the revival of the cottage industries is an urgent necessity. Small industry makes for equitable distribution of wealth. The development of cottage industries will also help the

village communities in India to attain the maximum amount of self-sufficiency.

Measures
suggested
for the
revival of
cottage
industries.

The State should pay immediate attention to the decaying industries and adopt effective measures for the revival of the cottage industries. The Government of the Indian Union have been paying greater attention to the development of various cottage industries. In spite of all the powerful factors playing against them, the indigenous industries did not completely disappear. The cottage worker enjoys certain advantages as compared to the industrial worker. He works in the more congenial atmosphere of his own home where he is assisted by his family members. His products find ready market in those places which have not as yet been penetrated by railways. Again, there are certain products for which machine-made substitutes are not available. Sometimes, cottage products are found to be more durable and of greater artistic value to suit individual's taste. All these factors account for the survival of the cottage industries in the face of keen competition presented by large-scale industries, providing occupation to a large section of Indian population. The following measures, if adopted, will go a great way in promoting and developing cottage industries and the Government of the Indian Union have a responsible part to play in this connection.

(1) Power-driven machineries should be installed, wherever possible, to increase the volume of production and reduce the cost of manufacturing. Arrangement should be made for supplying hydro-electricity at cheap rates to the cottage workers in the rural areas. Improved implements such as the fly-shuttle or swing machine, and improved raw materials, e.g., sheet metal or mill yarn, should be made available to the cottage workers through governmental agency at controlled rates. They should be given the benefit of payment by easy instalments and further, if necessary, they should be provided with cheap credit through Co-operative Credit Societies.

(2) Cottage industries should be located in and around the areas where river-valley projects are being developed.

In selecting the sites, care must be taken to see that peasants and others may be engaged and equally benefited.

(3) Arrangement must be made for imparting technical education, through the medium of the mother tongue, to the cottage workers with little or no theoretical education. They must be acquainted with improved methods of manufacture.

(4) Co-operative Sales and Co-operative Purchases Organisations should be set up to ensure that the cottage workers can purchase necessary raw materials at reasonable prices and sell their wares in time and for fair return.

(5) State-aid in the form of tariffs and subsidies should be extended to the cottage industries to encourage expansion of the market for their products.

(6) State should adopt well-defined principle of buying cottage products in substantial quantities, if and whenever possible, and this will give a great fillip to the industry.

(7) Competition must be eliminated and co-operation established between the cottage and the large industries. The cottage worker may engage himself in producing components to be assembled in large factories, while he, on his part, may obtain semi-finished raw materials from large factories. Thus each will act as a complementary to the other.

In short, it may be said that the future of our cottage industries is quite bright and their development on proper lines will not only benefit several millions of workers engaged in them, but will immensely improve the economic set-up of the country.

Other manufacturing industries : In recent years several new industries have been established in India or some old industries have been Indianised. With the attainment of independence and installation of the national government, pent up forces of industrialisation and economic development have all at once been released, and the country is humming with industrial activities. Industries so long neglected or left in the hands of foreign

capitalists, have been taken up right earnestly, and new industries are being set up in areas which had so long remained totally undeveloped. The plastic industry, rubber manufactures, manufacture of automobiles and locomotives, tea plantation, fishing industry, manufacture of fertilisers and machineries of different designs to be used in different other industries are only a few illustrations of India's ever-growing industrial activity which bears unmistakable signs of the country's onward march to industrialisation. India will provide a good example of what a great stride a country's industrial progress may make within a short space of time, once it is assured of abundant supply of raw materials and high internal demand and favoured by a sympathetic national government.

QUESTIONS

1. Discuss the growth of the iron and steel industry in India, and the prospect of its further development.
2. How far do geographical factors help the growth and distribution of the jute and glass industries in India?
3. India's steel industry requires expansion. Besides Bihar and West Bengal, which other provinces can offer facilities for erection of iron and steel works? Give your reasons.
4. Examine critically India's position for developing her key industries, emphasising mainly on the localisation of industries.
5. Indicate the future of automobile and air craft industries in India, mentioning the suitability of areas where they are intended for.
6. Eastern Pakistan produces jute and West Bengal manufactures this so that the position of jute is in a very anomalous position. What satisfactory measures would you suggest to cope with this anomaly?
7. "The present industrial renaissance is nothing short of the pangs of birth." Discuss the above in the light of the present world economy.
8. Of the jute and cotton textile industries which is the more beneficial for Indian Union, and why? Describe the present position of the industry you select.
9. Analyse the importance of cottage industries in the economy of the Indian Union. Discuss the measures that should be adopted for their revival.
10. Discuss the present position of the iron and steel industry in India noting the new sites that offer facilities for erection of iron and steel plants.

11 Some industries are tied to the sources of their raw materials while others are not. Select any two manufacturing industries of India having these contrasting characteristics and explain the reasons for the concentration in one case and wide diffusion in the other.

12. In an economic plan of India which industries, in your opinion, be given the highest priorities, and why? State also the advantages which India possesses for developing those industries

13. Answer any two of the following :—(a) How would you account for the fact that the silk industry has declined in Bengal, but continues to develop in Kashmir and Mysore? (b) What geographical factors have determined the distribution of woollen industry in India? (c) What is the future of the paper industry in India?

14 Draw a sketch map of India indicating the areas having a large raw cotton production and the more important places where cotton mills are located. Also comment on such localisation of the cotton industry.

15. (a) The growth of Cawnpore as an industrial centre in recent years has been phenomenal. State the causes. (b) Why was Jamshedpur selected by the Tatas for location of their steel company? What subsidiary industries have been established there?

16. State briefly the reasons why cotton mills have not been established in Assam?

17. India's Sugar Industry is of recent growth. Mention the factors for its development and the states where mills are located.

18. Name the most important places in India where cotton mills have been established and state the reasons for selection of these places.

19. What special advantages has Bombay Presidency for the establishment of cotton mills? Do you think West Bengal and Orissa are not proper places for the development of cotton textile mills?

20 What are the essential raw materials for the manufacture of cement? State the places where this industry is at present located in India and discuss its possibilities.

21 Describe briefly the difficulties that the Jute mill Industry of India is facing today. How do you think these difficulties can be solved?

22. Examine the present position and future prospect of the iron and steel industry of the Indian Union.

23. Name the indigenous raw materials used for the manufacturing of Paper in India and mention where they are found. Name also the materials that have to be imported for this purpose. Can India be made self-sufficient in paper supply?

24. Examine the present position of the Indian Sugar Industry. Why is the industry mainly concentrated in the Uttar Pradesh and Bihar?

25. What are the raw materials for the following industries and where and to what extent are they found in India?

(a) Chemical, (b) Iron and steel and (c) Paper.

26. Discuss the present position and the future prospect of the paper industry in India.

27. Account for the localisation of Iron and Steel industry at Jamshedpur. What other places in India are suited for the future development of this industry?

28. Account for the location of the jute mill industry on the banks of the Hooghly. Discuss the position of this industry in regard to raw jute supply.

29. Discuss the future prospects of the Automobile industry in India.

30. Briefly describe the present-day condition of the industrial structure of India and the policies adopted by the Government of India in the first Five Year Plan for the expansion of industrial activities of the country.

31. Discuss the present position and the future prospect of the ship-building industry in India.

32. Give an account of the Air-craft industry of India.

33. Write short notes on the silk industry of India.

34. Write short notes on :—

(a) Glass, (b) Rubber and (c) Fertilizer industries of India.

35. It is said that the jute industry has been much affected on account of the partition. Do you agree?

36. Give an idea of the present position of sugar industry in India.

37. What steps are being taken for the revival of cottage industries in India?

38. "Durgapur is the future Ruhr of India". Do you agree with this statement?

CHAPTER VII

COMMUNICATION SYSTEM

The importance of all forms of transport in all spheres of modern life, especially the industrial and commercial, can hardly be overestimated. Progress has been most rapid and profitable where transport facilities have been most highly developed. Transport has been a major problem in a vast sub-continent like India since very early days. Even now the means of communication is neither adequate nor satisfactory. The distances to be covered are tremendous, the natural hindrances formidable, and in many parts the climate quite unfavourable. Hence to provide the whole country with an up-to-date system of transport is a huge task entailing the expenditure of an enormous sum of money. Northern India has a better system of transport as it is mostly a plain and has rivers which are navigable to a great extent.

General
Survey.

The development of transport is an essential precondition of industrial progress. The importance of transport in the plans for economic development of the country was appreciated by the framers of our Five Year Plans. Allocation of Rs. 900 crores, representing 16·1 per cent of the net investment during the Second Plan period, as against an investment of Rs. 536 crores in the development of transport and communications during the First Plan period, reflects the amount of emphasis laid by the framers on this sector in the two successive plans.

The main lines of communication in India are found in *railways, rivers, roads and airways.*

Railways.—Railways are the most important of all the means of communication in India. Ordinarily, railways were built up in India for military purposes. The frequent visits of famine necessitated the extension of railways. In a country like India, which is more or less like a continent,

Railways,
the most
important
means of
transport.

the railways have brought about an equalisation of prices throughout the country. The rapid industrialisation of the country is largely due to railway development. It has fostered agricultural production and encouraged the establishment of large industries. It has brought about a sense of unity in the country.

Railway
mileage.

In undivided India about 43,000 miles of railway lines were open to traffic. These were of three different gauges, namely, *Broad gauge* (5' 6"), *Metre gauge* (3' 3 $\frac{3}{8}$ ") and *Narrow gauge* (2' 6"). Metre gauge lines were operated in Assam, Rajasthan, Saurashtra, South India, North Bihar and in some parts of West Bengal, while the narrow-gauge railways exist in the mountainous areas and in the rural areas of West Bengal. Broad-gauge lines operate in all other parts of the country. Due to partition 9,000 miles of railways have gone to the share of Pakistan, so that length of railways in Indian Union is about 34,000 miles. and this length is expected to reach the target of 37,500 miles by 1960-61.

The chief
railway
routes in
India.

India requires more railway mileage. In comparison with U.S.A., Canada and England, India lags far behind in railway development.

Railway mileage.

Countries	Area 000 (sq. miles)	Mileage of total railways	Mileage of lines per 100 sq. miles	Population million	Persons ser- ved by each railway mile
U.S.A.	2977	2,57,000	8.6	150	584
Canada	3500	40,400	1.2	14	343
Indian Union	12205	34,000	2.7	3568	10,500

Prior to re-grouping, the following were the chief railways of India :—

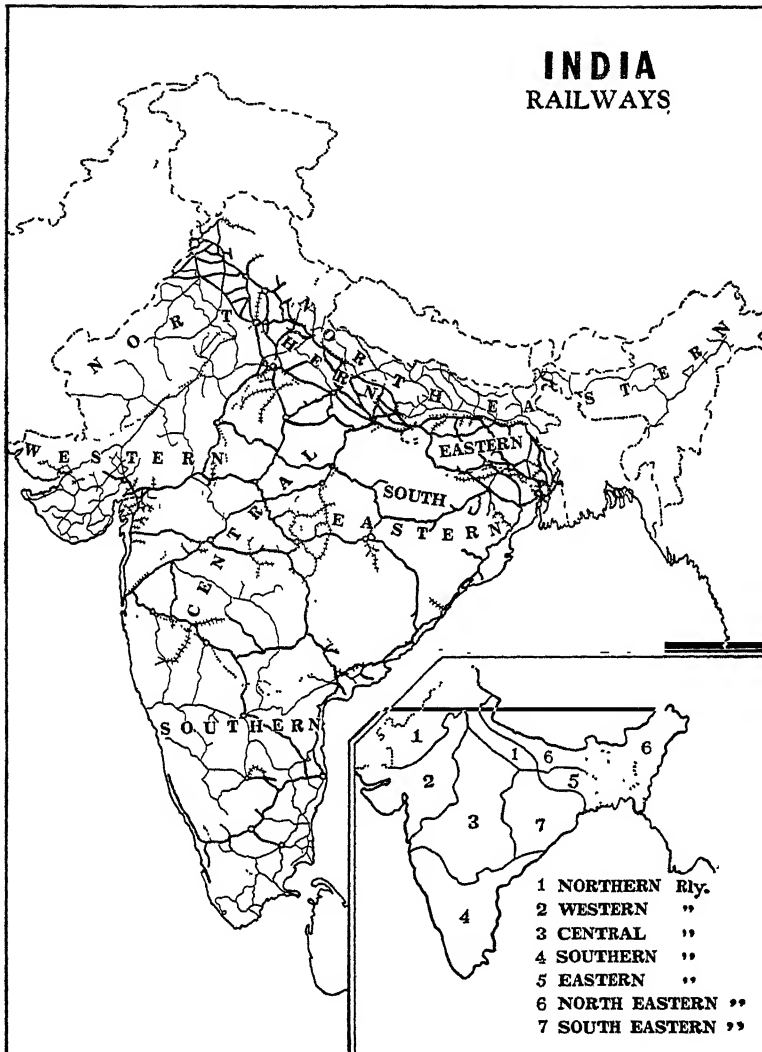
	Length	Areas served
(1) Oudh and Tirhut Railway (O. T. Railway)	2033 miles	Northern districts of Bengal, Bihar & U.P.
(2) Bengal Nagpur Railway (B. N. Railway)	3000 „	Bengal, Orissa & N. Madras and C. P.
(3) Bombay, Baroda & Central Indian Railway (B B & C. I. Railway)	4000 „	Bombay, U. P. and Central India.
(4) East Indian Railway (E. I. Railway)	4000 „	Bengal, Bihar, U. P. and Punjab.
(5) Great Indian Peninsula Railway (G. I. P. Railway)	4000 „	Bombay, C. P. & U. P.
(6) Assam Railway (A. Railway)	1300 „	Assam.
(7) Madras & South Marhatta Railway (M & S. M. Railway)	3000 „	Madras, Mysore & C.P.
(8) South Indian Railway (S. I. Railway)	2500 „	Madras, Mysore, Travancore and Cochin.
(9) North Western Railway (N. W. R.)	7000 „	Punjab, Sind & N.W. F. P.

The component parts of the Indian Railway system originated at different times and were formerly managed by different companies. This resulted in multiplicity of railway systems, each with its individual outlook, sometimes anti-national, impeding the steady development of the country's trade and commerce. The Acworth Committee (1920-21) recommended state management of railways and also advocated construction of new lines by State Agency. Accordingly, most of the railways of India, with the exception of a few narrow-gauge railways, have been nationalised. Further, to avoid heterogeneity, the Government decided in 1951 to re-group the Indian railways into six zones as follows :—

Re-group-
ing of
Railways.

Zone	Length	Former Railways included	Head-quarter	Areas covered
1. Northern Railway (N.R.)	5980 Miles	East Punjab (entire). East Indian & B.B. & C.I. (Part) and Delhi State Railways of Bikaner & Jodhpur (entire).	Delhi	Uttar Pradesh, East Punjab, Rajasthan, P. E. P. S. U., Delhi and Jodhpur.
2. Central Railway (C.R.)	5428 "	G.I.P. (entire) Scindia, Dholpur and Nizam State Railways (entire).	Bombay	Hyderabad, Bombay, Madhya Bharat, M. P., U.P. and Vindhya Pradesh.
3. Western Railway (W.R.)	5660 "	Entire railway systems of Jodhpur, Kutch and Saurashtra and part of B.B. and C.I.R.	Bombay	Northern Bombay, Rajasthan, Saurashtra and Kutch.
4. Southern Railway (S.R.)	5999 "	Entire S.I.R. and Madras M. & S.M.R. and the state railway of Mysore.	Madras	Mysore, Travancore-Cochin, Madras, Hyderabad and southern districts of Bombay.
5. North Eastern Railway (N.E.R.)	4706 "	Entire O.T.R., A.R., and D.H.R. and some parts of B.B. & C.I.R.	Gorakhpore	Assam, Northern part of West Bengal and Bihar and eastern and northern part of U.P.
6. Eastern Railway (E.R.)	5667 "	Entire Part of E.I.R. to the east of Moghalsera	Calcutta	West Bengal, Bihar, eastern part of U.P. and Vindhya Pradesh.
7. South Eastern Railway (S.E.R.)		Entire B.N.R.	Calcutta	Orissa, Andhra and M.P.

N.B. In 1955 the sixth group was split up into E. R. and S.E.R. to relieve the over-burdened Eastern Railway of the heavy traffic carried by it.



The regrouping of the entire railway system of India has been based on the following principles, namely, (1) each Basis of re-railway system is to serve a compact region and (2) each grouping and system is to be large enough to provide a H.Q. organisation expected of high calibre. (The route mileage of the Zones vary benefits, between 4,800 and 6,000).

The following advantages are expected from re-grouping :—

- (1) Each Zone will have uniform rates and freights.
- (2) Duplication of administrative work will be avoided and economies will follow.
- (3) There will be unified control at junctions and transshipment points.
- (4) Efficiency will be increased because power, equipment and workshop facilities will be used more intensively.

Central Railway. The Central Railway passes through Madhya Bharat, Madhya Pradesh, Bombay, Hyderabad, Vindhya Pradesh, Uttar Pradesh and north-western part of Madras. The areas served are agriculturally developed and bristle with industrial activities. This line handles cotton and manganese of Madhya Pradesh and timber of Bhopal.

Northern Railway. The Northern Railway serves an area of about 145,000 square miles in the States of East Punjab, PEPSU, Delhi, Rajasthan and Uttar Pradesh. This railway system has improved communication between India Union and Kashmir and it handles the overland transport between Indian Union and W. Pakistan.

Western Railway. The Western Railway serves an area of about 150,000 square miles extending over the States of Bombay, Rajasthan, Madhya Bharat and Madhya Pradesh. The system serves the industrial areas of Bombay, Ahmedabad and Baroda and carries raw cotton to the cotton textile centres.

Southern Railway. The Southern Railway serves the States of Mysore, Travancore-Cochin, Madras, Hyderabad and southern districts of Bombay. The system passes through a very densely populated and fertile area where agriculture and industries have developed, mining industries have prospered and potentialities of further development are great due to the prospect of generating hydro-electricity.

N. E. Railway. The North-Eastern Railway, principally a metre-gauge system, serves the agriculturally well-developed regions of Bihar, U.P., northern districts of West Bengal and Assam,

The line carries large quantities of sugar-cane, tobacco, tea and rice and largely handles the labour traffic of U.P. and Bihar.

The Eastern Railway passes through the most developed and densely populated areas of the country where agriculture, mining and manufacturing industries have equally prospered. This system handles the largest amount of goods traffic and is one of the most important passenger carriers. It handles coal, iron ore, mica, manganese and jute, and connects the first port of the Republic with its extensively scattered hinterland. Eastern Railway.

The South Eastern Railway, serving the States of West Bengal, Orissa, Andhra and Madhya Pradesh, connects the industrially developed areas with those abounding with mineral resources. The system connects the ports of Calcutta and Vizagapatam with their hinterlands. South Eastern Railway.

Post-war Railway development schemes have the following objectives in view, namely, (1) extension of railway mileage, (2) unification of different railway systems, (3) removal of transport bottlenecks and (4) improvement of existing service.

The new railway line, *Gandhidham-Disha Link* was opened to traffic on the 2nd October, 1952. This important railway line, covering a distance of 187 miles, connects the port of *Kandla* with its hinterland. Newly constructed lines.

The Assam-Bengal Link, a metre-gauge system of a length of 142 miles, connects the railways of Assam with those of Bihar. The partition of the country necessitated construction of this line to establish direct communication among the States of Assam, Bihar and West Bengal.

The newly constructed *Railway-link between the Indian Union and Kashmir*, extending from Mukerian to Pathankot, covering a distance of 27 miles on broad-gauge system, was opened to traffic on the 7th April, 1952. This new link has shortened the railway distance between the Indian Union and Kashmir by 44 miles.

Perfor-
mance
under First
Plan.

The performance of the railways during the First Five Year Plan period has not been upto expectations. Several major industries have, from time to time, been complaining about the inability of the railways to provide adequate facilities for the movement of raw materials or finished goods. Shortage of wagons and locomotives, insufficient line capacity, absence of proper transshipment arrangements at important junctions, and, above all, a cumbrous freight structure—these have been some of the major handicaps felt by trade and industry. The Plan allotted a sum of Rs. 400 crores for railway expansion. The estimated expenditure at the end of March, 1956, is Rs. 432 crores. It is reported that 1210 locomotives and 21,334 wagons have been procured as against 641 locomotives and 19,143 wagons originally envisaged. The position has somewhat improved, but it is by no means adequate.

Railways
in the
Second
Plan.

In view of the vast increase in production that is being contemplated and in view of the acute difficulty felt by several major industries in the last few years, it is of the utmost importance to see that there is no transport bottleneck in the course of the Second Plan. In the Second Five Year Plan, a sum of Rs. 1,125 crores has been allotted for the railways. The main items of expenditure are Rs. 380 crores for the improvement of rolling stock, Rs. 100 crores for track renewals, Rs. 80 crores for line capacity work and Rs. 65 crores for new constitution. During this period 1600 miles of doublings and 256 miles of conversions will be made, and 850 miles of new lines are contemplated for the railway's own operational needs and for additional coal and steel traffic. The railways will have a capacity to move 160 million tons of goods and will have an increase of 15 per cent in the case of passenger train miles. There will be an overall provision of about 50 per cent increased transport capacity.

Import-
ance of
Roads.

Road Transport.—The importance of roads and the facilities of road transport in a country of the size of the Indian Republic can hardly be exaggerated. A system of well-constructed and properly-maintained roads is essential for the country's industrial progress and commercial deve-

development. The roads also play an important role in the defence of the country. India's backwardness in the agricultural, industrial and commercial development is due, to a large extent, to the deficiency in her road system. Her undeveloped and unbalanced road communication between rural and urban areas, between centres of agricultural operation and industrial establishment and between regions of production and marketing areas, has largely contributed to the country's economic backwardness.

The Indian Union has little over 250,000 miles of roads. Considering the size of the country this development is very meagre. Of the total roads, 75,000 miles are only metalled. There exist only 22 miles of road per square mile of territory and, of this, barely one-third is suitable for motor traffic. For every thousand of the population India has not even three quarters of a mile of road as against 3.6 miles in the United Kingdom and 21 in U.S.A.

Roads in India.

Road mileage in different countries

	Area (in 000 sq. miles)	Population (in million)	Total mileage of roads
U S. A.	.. 2,977	150	3,009,000
U.K.	.. ..	50.5	184,000
France	.. 215	40.5	405,028
India	.. 1,220.5	356.8	255,460

Want of adequate roads is keenly felt in rural areas. Recently, many roads have been constructed throughout the country for motor vehicles. Indeed, motor vehicles have greatly revived the road traffic, but much more remains to be done in this respect. Railways have served their purpose with credit and it is now felt that to help the development of the country, roads must be opened and improved—not to supplant the railways in removing goods and people over long distances, but to provide a properly co-ordinated supplement to railway transportation.

The road system of India is divided into five administrative classes, viz., National Highways, State Highway, District Roads, Municipal Roads and Village Roads. The National Highways, the principal arteries of road communication in the country connecting different states, ports

Classification.

and foreign countries are maintained by the Union Government. There are, at present, six National Highways :

- (1) Calcutta to Delhi.
- (2) Delhi to Bombay.
- (3) Bombay to Madras.
- (4) Madras to Calcutta.
- (5) Calcutta to Bombay via Nagpur.
- (6) Delhi to Madras via Nagpur.

State Highways, possessed and maintained by the State Governments, pass from one district to another or connect one end of the State with the other end, and link up the National highways with different parts of the States through which they pass. The District and Village roads establish communication between the remote rural areas and the urban regions and serve as feeder roads to the other means of communication.

Future. The Planning Commission recommended the construction of 450 miles of new roads, 43 large bridges and a large number of small bridges as well as improvements of about 2,200 miles of roads. The Central Government planned to spend Rs. 27 crores over 5 years for the development of national highways, a further Rs. 44 crores for the improvement of other selected roads and Rs. 21·15 lakhs on Central Road Research Institute in order to formulate the schemes of road-development in different parts of the country. The Community Development Projects aim at improving village communication.

The frontier routes. *The Frontier Routes*—Indian Union has a land frontier, more than 3,000 miles long, extending from Burma on the north-east to Pakistan and Russia on the north-west. The country is linked up with China, Tibet and the two wings of Pakistan by land. This extensive land frontier offers excellent opportunities for establishing trade connection with these countries, but dense forests, high mountains and deserts have hindered development of trade through land routes. Transportation is extremely difficult and absence of good motorable roads and through railway lines from India to her frontier countries accounts for the poor volume of trade through her frontiers.

One road route goes from Leh in Kashmir to Tibet and Sinkiang, passing through the Karakoram Pass at an altitude of 18,000 ft.

From Lado in North-East Assam one route runs to China through Burma. This route is known as the Ledo-Burma Road and offers a vital link between India and China. The route, if properly developed and maintained, will help the development of Indo-China trade.

The Inland Waterways of India are mostly provided by the three great rivers—the Indus, the Ganges and the Brahmaputra. These three great river systems permit ^{The three great rivers.} 26,000 miles of navigation. From ancient times, the trade and commerce of Northern India have been facilitated by the abundance of navigable streams. But the once flourishing inland navigation of India received a great set back with the development of railways.

The Ganges and the Brahmaputra are navigable by steamers all the year round or for the greater part of the year, for hundreds of miles above their mouths. The Ganges is navigable as high as Kanpur and steamers pass ^{The Ganges and the Brahmaputra} up the Gogra as far as Fyzabad. The Brahmaputra is navigable by steamer as high as Dibrugarh and there is steam navigation on its tributary, the Surma, as far inland as Sylhet. The economic unity of this system was dislocated by partition in 1947. The waterway systems of north-east consisting of some 5,000 miles of navigable channels, remain by far the most important in India and continue to serve the needs of the tea and jute industries of Calcutta to a major extent. Two of the longest routes run from Calcutta to Patna via Ganges, 920 miles, and from Calcutta to Dibrugarh in Eastern Assam, via Brahmaputra, 1,175 miles. The Hooghly on which Calcutta is situated, ^{Rivers of Southern India.} is navigable all the year round upto Nadia and further up from July to October. There are also innumerable canals, creeks and backwaters affording facilities for water transport. The canals of Mahanadi Delta in Orissa, in the Buckingham, Godavari, Krishna and Dummadudan system in Madras and the backwaters of southern Malabar coast are extensively used for transport purposes. The rivers of

Southern India are not very suitable as waterways. During the rainy season they are in flood and again in summer they are reduced to mere pools making navigation impracticable. The Mahanadi, Godavari and Krishna are navigable in their upper courses but the traffic on them is not very considerable. Most of the irrigation canals of Southern India are not suitable for navigation as they are usually shallow and pass through sparsely populated regions.

The great disadvantage of rivers of India is that they usually enter the sea in shallow, sandy delta-mouths, instead of broad, deep estuaries.

River
Research
work.

Constitutionally, the responsibility for maintenance and improvement of navigation facilities vests in the State Governments. The Central Government is responsible for national waterways. A Central Government Research Station has been established at Poona which is conducting experiment designed to protect the probable future configuration of the Hooghly, the silting of which is a matter of great concern. The Government of West Bengal also maintains its own research station at Haringhata near Kanchrapara.

Waterway
projects.

The following are some of the important waterway projects, now in various stages of consideration or construction :

(1) A canal to link lower Raniganj coalfields with the Hooghly. This project forms a section of the general plan for the development of Damodar Valley.

(2) Works to make Mahanadi river in Orissa navigable for 300 miles up from the mouth as a result of the control over flood waters in this area which Hirakud Dam project will establish.

(3) Kakrapara project in Bombay to provide navigable channels from the sea for some 50 miles beyond Kakrapara.

(4) Ganga Barrage between the head-waters of the Hooghly system in Murshidabad district and the Ganges system in Bihar and Uttar Pradesh.

(5) A long term project for linking the east and west coasts of India through the channels of the Ganges, Sone, Rihand and Narbada rivers by means of system of dams and locks.

(6) Deepening and general improvement of existing river channels as, for example, that of Ganges between Buxar and Allahabad.

(7) Provision of a canal between Diamond Harbour on the Hooghly and Kidderpore (Calcutta), if control of silt in the Hooghly proves very costly than an entirely new canal.

The Coastal Shipping.—India has over 3500 miles of coast line, extending international trade with the East and the West. The Southern and Western seas—namely, the Bay of Bengal and the Arabian seas with the ports and harbours on their coasts offer unique opportunity for coastal trade. But India faces a shortage of ships. She possesses gross registered tonnage amounting to 236,333 engaged in coastal trade. The Shipping Policy Sub-Committee appointed in 1945 suggested dynamic shipping policy and recommended that the entire coastal trade of India should be reserved for Indian shipping. A system of statutory licensing was introduced under the control of Shipping Act of 1947 to give effect to the policy on coastal reservation. The importance of country-craft in the economics of India's coastal transport cannot be ignored. The sailing vessels, though small in size, carries the bulk of the cargo from port to port at a relatively cheap cost and plays a vital part in serving as a feeder to industry.

Overseas Shipping.—The sea-routes radiate mainly from the five major ports of India, namely, Calcutta, Vizagapatam, Madras, Bombay and Cochin. The Suez route, the Cape route, the Australian route and the Singapore route are the principal sea routes of India. The Suez route has immensely helped development of India's trade with Europe. India sends raw materials to European countries and in return receives manufactured articles from Europe. The Cape route connects India with South Africa and occasionally ships plying between India and South America sail

along this route. The Singapore route maintains India's heavy volume of traffic with China, Japan, Canada and New Zealand. India imports cotton and silk manufactures, iron and steel products, machineries, chemicals, paper and food-stuff through this route and sends her raw cotton, manganese, jute, mica, shellac and pig iron to the countries at the other end of this route. The Australian route carries India's imports of wheat, wool, canned fruits, provisions, etc. from Australia and her exports of raw cotton, jute, tea and linseed.

Present
position
and
future.

In order to facilitate the entry of Indian shipping into all important overseas trades and to assist in solving the difficulty experienced by Indian Shipping Companies, the Government of India have announced their scheme for the setting up of Shipping Corporations on State-cum-private ownership basis. India's present gross registered tonnage in overseas trade amounts to 175,000 only, i.e. about 2 p.c. of the total sea-borne trade. Necessary assistance is being given to Indian Shipping Companies for acquisition of additional tonnage.

The Indian Shipping Companies, namely, Scindia and India Steamship, apart from Eastern Shipping Corporation, are at present operating in overseas trade. They are operating in India-U.K.-Continent trades and also in India-North America trade. The Eastern Shipping Corporation is operating in the India-Australia and India-Malaya trade.

Airways :—Aviation itself is of very recent origin and specially so in India where it has been started seriously only a few years ago. India has a great advantage in air transport because it is a plain land and no large mountains or adverse ocean currents offer any hindrance. For defence and transport purposes Airways are of great value but they are also important for commercial transport of light but valuable goods. India is a country whose balance of trade is in most cases in her favour. So large quantities of export bills are drawn in India which require to be communicated soon. Aviation will facilitate presentation of such bills. Businessmen may travel very rapidly by air and thus trade facilities will be enhanced. All the important ports of India are well connected by railways so that goods

Benefits.

brought by air can be sent immediately to even the interior-most parts.

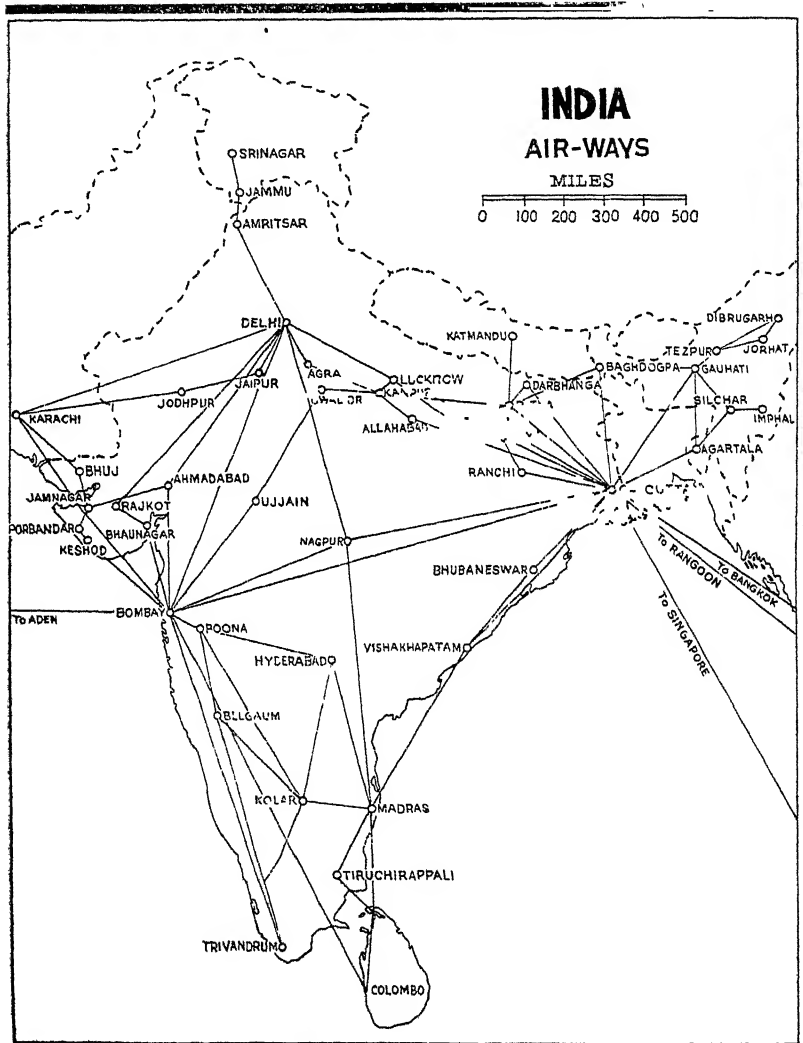
Flying began in India as early as 1911 when first experimental flights were made by army officers in aeroplane sent to India for demonstration by Bristol Aeroplane Company. After the end of World War I in 1918, the real progress of civil aviation began in India. The first regular mail service in India was organised in January, 1920, on the initiative of Lord Lloyd, the then Governor of Bombay. In 1933 both internal and external air services began to take definite shape in India. The first Indian airlines, The Tata Airlines, began to operate a weekly service between Karachi and Madras in October, 1932. Indian National Airways Ltd. established in 1933, started a weekly service between Calcutta and Rangoon and a daily service between Calcutta and Dacca. The Air Services of India came into existence in 1937 operating air services between Bombay and a number of Kathiwar States. The next phase of development in civil aviation was the introduction of the Empire Airmail Scheme in 1938 under which all first class mails between empire countries on U.K.-Australia routes were to be carried by air, by introducing larger aircraft and by developing passenger and freight traffic. This scheme gave an impetus to the growth of civil aviation in India. With the outbreak of War in 1939 the development of aviation in India was phenomenal. With the entry of Japan in the war, the military demand for air transport became so urgent that it was impossible for civil companies to carry on their normal traffic and finally they became contract operators for the Defence Services. The air fleets were further strengthened by the addition of Lease-Lend aircrafts.

Short
History.

Indian Union has three big airports, namely, Santra-Cruz at Bombay, Dum Dum at Calcutta and Palam at Delhi, maintained on international standard. At the beginning of 1953, 77 airfields were being maintained and operated by Civil Aviation Department. Many new airfields are now under construction. The establishment of daily air services on the main trunk air routes covering India from north to south and east to west, with link routes connecting the trunk

Present
working.

routes at suitable points and with extension to the capitals of adjacent countries is contemplated in the plan of post-war Civil Aviation of India. At present India has a total unduplicated route on scheduled services extending upto 26,903 miles.



In the field of external air services, there has been steady progress since independence. Before independence India's external services were confined only to Burma and Ceylon. Today aircrafts fly to Aden, Bangkok, Cairo, Djakarta, Dussldorf, Geneva, Kabul, London, Nairobi, Paris, Rome, Singapore and Zahidan as well as to our neighbouring countries like Burma, Ceylon, Nepal and Pakistan. Air Transport agreements have been concluded with Afghanistan, Australia, Ceylon, Egypt, France, Netherlands, Pakistan, Philippines, Sweden, Switzerland, United Kingdom, U.S.A., Thailand and Iran. Several foreign airlines have air service in the Indian Union. These foreign lines are the following :—

1. British Overseas Air Corporation (B.O.A.C.)
London-Sydney—via Calcutta.
London-Singapore via Bombay and via Delhi
and Calcutta, London-Tokyo via Calcutta.
2. Qantas Empire Airways—London-Sydney via
Bombay and London-Sydney via Calcutta.
3. Orient Airways—Karachi, Delhi-Calcutta and
Dacca, Rawalpindi-Dacca via Delhi, Allahabad
and Calcutta.
4. K.L.M. (Royal Dutch Airlines)—Austerdam-Dja-
karta via Calcutta.
5. Pan-American World Airways—New York-San-
Fransisco via Delhi and Calcutta.
6. Trans-World Airlines (T.W.A.)—Washington-
Bombay.
7. Air France-Paris-Saigon via Calcutta.
8. Air Ceylon—Colombo-London via Bombay, Colom-
bo-Jaffna-Madras, Jaffna-Trichinopoly.
9. Brathen's — Oslo-Hongkong via Bombay and
Calcutta.
10. Philippine Air Lines—Manila-London via Calcutta.
11. Scandinavian Airlines System (S.A.S.) Stockholm-
Tokyo via Calcutta.
12. Iranian Airways—Teharan-Bombay.
13. China National Airways.

Nationali-
sation of
Indian
Airlines.

As it was found that under the prevailing conditions of traffic load and intensity of operation, the air transport industry could not develop on an economic basis under private enterprise, the Planning Commission recommended that the industry should be consolidated and taken over by the Government. Accordingly, the Air Corporations Act was passed in 1953, which provided for the establishment of two Air Corporations—to be known as Indian Airlines Corporation and Air India International—to operate the internal and external services respectively. From 1st Aug., 1953, all Indian air lines have been nationalised. The following advantages are claimed in favour of nationalisation.

Advantages
of Nationa-
lisation.

1. The available resources in equipment, workshop, capacity and technical personnel would be used to the maximum benefit.
2. From the point of view of defence, operation of all air services by a State Organisation would obviously be the most desirable arrangement.
3. Air transport is a public utility and ought to be developed as such to serve national interests.
4. Rapid developments are taking place in the techniques of civil aviation and only a State Organisation can command the resources to take the fullest advantage of these technical developments.

Line System of the Indian Airlines Corporation

Line
systems.

Line 1 (Formerly Airways India) Calcutta, Bhubaneswar, Vishakapatnam, Madras, Bangalore, Nagpur, Bombay, Gauhati, Dibrugarh, Siliguri, Dacca.

Line 2—(Formerly Bharat Airways)—Calcutta, Patna, Banaras, Lucknow, Delhi, Agartala, Gauhati, Silchar, Imphal, Tezpur, Jorhat, Mohanbari, Chittagong, Bangkok, Singapore, Djakarta.

Line 3—(Formerly Himalayan Aviation and Kalinga Airways)—Bombay, Karachi, Zahidan, Kandahar, Kabul.

Line 4—(Formerly Indian National Airways)—Delhi, Calcutta, Jaipur, Jodhpur, Karachi, Rangoon, Lahore, Amritsar, Jammu, Srinagar, Patna, Katamandu.

Line 5—(Formerly Deccan Airways)—Hyderabad.

Line 6—(Formerly Air India Ltd.)

Line 7—(Formerly Air Services of India) Bombay.

Indian External Services—Air India International

1. Delhi—Bombay/Calcutta—Bombay—Cairo—Rome—Geneva—Paris—London.

2. London—Dusseldorf—Rome—Cairo—Bombay.

3. Karachi—Aden—Nairobi.

The growing popularity of civil aviation in the Indian Republic will be evident from the following table :

Year	Freight ton-miles	Mails carried (000 lbs)	Total load ton-miles
1948	186	232	1,652
1950	852	696	2,937
1952	1,006	698	3,214

The most important feature of India's aviation is the *night air mail services* in Delhi—Bombay—Calcutta and Madras.

Questions

1. Explain fully the geographical and economical factors that contribute to the development of the transport systems in India. How far have the airways developed in India ?

2. What advantages will there be in the regrouping of Indian Railways as has been decided by the Government ?

3. Draw a map of India and show the main air routes now in operation with the principal air ports. Discuss the future of air transport in this country.

4. Describe the principal air routes now in operation in India. Do you think India offers facilities for further development of air transport ?

5. You propose to go by rail from Amritsar to Jamshedpur via Delhi and Nagpur. State the railway systems over which you will travel and the commercial importance of these places.

6. Discuss the part played by the Railways for commercial development of India. Do you think India should now pay more attention to the construction of roads and waterways than railways ?

7. Give a short account of the proposed places for the development of roads, railways and waterways of India. Which of these should receive immediate attention ?

8. Examine the relative importance of the principal means of communications for carrying on inland trade of India.

9. Give a short account of the part played by the rivers in the development of inland trade of India.

10. What are the different railway zones in India ? Mention at least two important industries served by each zone.

CHAPTER VIII

FOREIGN TRADE

History.

India had trade relations with distant lands from a very ancient times. The trade was mostly in rare and costly commodities, containing great value in small bulk. The opening of the Suez Canal in 1869 changed the character of India's foreign trade. The volume of trade began to increase but India began to import those commodities which she had hitherto exported such as cotton manufactures, silk, sugar, etc., and started to export cheap and bulky raw materials and food-stuffs. The preponderance of manufactured articles in the country's imports and that of agricultural commodities and raw materials in its exports were the most important feature of India's foreign trade throughout the British period. Even now India is primarily an exporter of food-stuffs and raw materials and an importer of manufactured goods. A quarter of import trade consists of cotton and cotton-goods, others are cotton textiles, mineral oils, machinery, art silk, paper, chemicals, provisions, drugs and medicines, hardware, liquors, spices, instruments and apparatus, etc. On the otherhand jute manufactures account for nearly a quarter of India's total export trade. Wool and wool manufactures, raw jute and cotton, tea, lac, seeds, grains, pulses and flour, minerals, leather, hides and skins, tobacco, fruits and vegetables are among the commodities exported from this country.

India's Imports of Principal Commodities in 1952-53

(lakhs of rupees)

Grains, pulse and flour	152,72	Oils, vegetable, mineral and animal ..	81,78
Cotton, raw and waste	76,67		
Cutlery, Hardware ..	14,26	Chemicals, drugs and medicines ..	24,86
Machinery of all kinds	87,87	Electrical goods and apparatus ..	13,81
Paper, pasteboard and stationery ..	12,79	Metals (Iron and Steel & manufactures thereof) ..	23,71
Cotton yarns and manufactures ..	4,99	Vehicles ..	28,15

India's Exports of Principal Commodities in 1952-53

(lakhs of rupees)

Fruits and vegetables ..	15,56	Spices ..	20,26
Tea ..	80,17	Tobacco ..	12,84
Cotton, raw and waste	28,86	Hides and skins, tanned and dressed and leather ..	20,08
Cotton yarns and manufactures ..	64,89	Jute yarns and manufactures ..	126,25
Non-metallic mining and quarry products and the like ..	9,86	Hides and skins, raw	5,69
Oil, vegetable, mineral and animal ..	24,91	Metallic ores and scrap iron or steel for re-manufactures ..	36,99
Seeds ..	4,55		

N.B. Imports from and exports to Pakistan are excluded in the above tables

With the outbreak of World War II, radical changes took place in the structure and volume of India's foreign trade. As the war advanced, the demand for raw materials increased by leaps and bounds. Manufactures also took a larger share in the total exports. This was due to demand for military equipments in the Middle East, where it was difficult to obtain supplies from western countries. This gave a definite stimulus to industrialisation in India and resulted in the rise of the volume of exports to an unprecedented height. Specially, the temporary disappearance of Japan and Germany in the Asiatic markets gave a wide

Changes
after
World
War II.

scope to India to expand and develop her trade with all Asiatic countries.

Post War
develop-
ments.

With the cessation of hostilities, this upward trend of India's export trade began to show signs of gradual reversal. A decline in the exports became visible and an inflow of imports of cheap commodities from foreign countries reversed the country's favourable balance of trade. The partition of the country further worsened the position. As a result, the Government of India had to devise various measures to meet this critical situation.

Before the War India had trade relations mainly with the U.K. and other Commonwealth countries. But the war brought about a great change in the direction of India's foreign trade. India's trade relation with the U.K. gradually declined and she established trade relations with U.S.A., Canada, Australia and other Far Eastern Countries.

Effects of
Partition.

The effect of partition has been even more marked. After the partition of India, the trade balance of the Indian Republic became adverse.

India's Balance Trade in Merchandise

(*lakhs of Rupees*)

	Imports	Exports	Re-exports	Total Exports	Balance of Trade
1951-52	942,49	728,94	392	732,86	— 209,63
1952-53	657,92	569,88	504	574,92	— 83,00

The extremely small proportion of India's trade through land routes was a noticeable feature of her foreign trades, only little over 2 p.c. of which was carried through land routes and the rest was sea-borne. But with the partition this relative position has substantially altered. The greater part of India's trade with Pakistan is done through land routes, and Pakistan occupies an important place in India's foreign trade. Further, India's supremacy in the export of certain commodities, particularly agricultural products, is now being challenged by Pakistan, so much so, that India, which was the greatest exporter of raw jute before the partition of the country, has now become the most important importer of the commodity.

It is expected that after the completion of the Five-Year Plans and successful implementation of the schemes of industrialisation, the position of India's foreign trade will be changed in her favour. She will then be self-sufficient in her requirements of food-stuffs and raw materials for industries. On the otherhand, she will be in a position to export large quantities of manufactured goods to the adjacent countries.

Entrepot (Re-exports) trade of India—From a very ancient time India acted as a distributing centre for many of the Asiatic countries. Even now India has a large volume of entrepot trade and many of her exports consist of re-exports of articles previously imported. Being situated in the centre of the Eastern Hemisphere, she is eminently suited to act as a convenient distributing centre, particularly for those Asiatic countries which have no sea-board of their own. The re-export trade is mainly in manufactured articles imported from Europe and America. The chief articles are textiles, raw wool, manufactured tobacco, vehicles, and machinery. The percentage shares of the principal countries in the re-export trade of India in the year 1942-43 were as follows :—

The U.S.A. 28 p.c.; Iraq 13 p.c.; the U.K., 9 p.c.; Ceylon, 5 p.c.; Aden, Palestine, Syria, Muskat, Ornam and Saudi Arabia—3 p.c.; each. The bulk of the trade passed through Bombay and Karachi.

The Direction of Overseas Trade—The following tables show the percentage shares of foreign countries in India's export and import trade :—

Exports (in p.c.)				
Countries	1939-40	1942-43	1948-49	
United Kingdom	.. 35.5	30.5	21.7	
U S A.	.. 12.0	14.8	15.7	
Australia	.. 2.1	8.6	4.7	
Burma	.. 6.9	4.9	2.4	
Canada	.. 1.5	2.1	1.8	
Argentina	.. 1.7	1.4	3.8	
Japan	.. 6.3	1.9	—	
Turkey	.. 2.7	9.3	—	
Ceylon	.. 3.3	7.7	—	
Pakistan	.. —	—	16.4	
Union of S Africa	.. 2.1	5.6	—	

Imports (*in p.c.*)

Countries	1939-40	1942-43	1948-49
United Kingdom	.. 25·2	26·8	22·9
U.S.A.	.. 9 0	20·0	—
Burma	.. 19 0	—	—
Japan	.. 11·7	—	—
Canada	.. 0·8	7·4	1·5
Australia	.. 1·4	4·9	5·1
Ceylon	.. 0·9	2·0	—
Germany	.. 4·2	—	—

Trade
with
U. K.

Trade with the U.K.—From the above tables it is evident that the United Kingdom has a pre-dominant share in India's foreign trade. But since the World War I, there began a tendency for both import and export trade to be diverted from the United Kingdom to other countries. In the early years of the present century the U.K. supplied as much as 65 p.c. of the Indian imports and took about 30 p.c. of the total Indian exports. But at present India exports more to U.K. than she imports from the U.K. The result is that the balance of trade is growing more and more in India's favour. As a result of last war's purchases, India has become a creditor of the U.K., and has accumulated large *sterling balances* held in London in the name of the Reserve Bank of India. The commodities exported to the U.K., are tea, jute (raw and manufactured), oil seeds, hides and skins, raw cotton, raw wool and lac. The principal commodities imported from the U.K. are machinery and mill work, cotton manufactures, instruments, dyeing and tanning substances, chemicals, etc.

Japan.

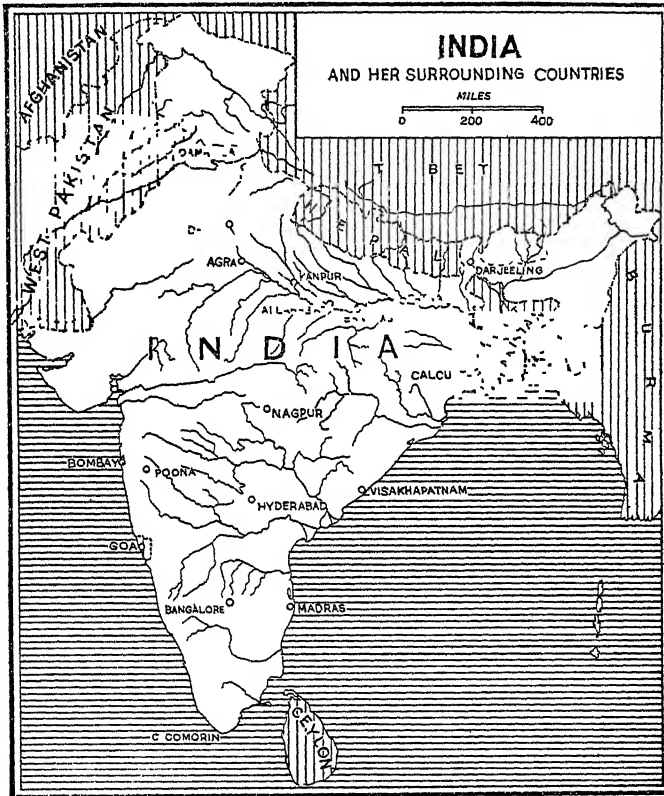
Trade with Japan.—After World War I, Japan became a formidable competitor of the U.K. in the Indian market till 1939. The principal commodities exported to Japan were raw cotton, jute (raw and manufactured), hides and skins, metals and ores and grains, and the imports from Japan consisted of cotton piecegoods, iron and steel machinery, silk, chemicals and toys.

U. S. A.

Trade with U.S.A.—The share of the U.S.A. in the foreign trade of India has almost doubled since the outbreak of the World War II, and the increase is being more than maintained even upto the present day. Next to the United Kingdom and Pakistan the U.S.A. has the largest

amount of trade with India at present. India's principal exports to the U.S.A. are tea, jute (raw and manufactured), hides and skins, lac, oilseeds, raw wool, raw cotton, etc. and the principal imports from the U.S.A. comprise machinery instruments, dyeing and tanning substances, paper and pasteboard, medicines, etc.

Trade with Burma—India's trade with Burma, which was treated before April, 1937, as coastal trade, is gradually growing in importance. India's principal imports from Burma..



Burma consist chiefly of mineral oil, rice and teakwood. The principal commodities exported to Burma are cotton and jute manufactures, coal, and coke, iron and steel, wheat and wheat flour, vegetable oils, paper and chemicals.

Trade with Australia. India imports raw wool, wheat, zinc and provision and stores from Australia and supplies tea, jute and cotton manufactures, raw cotton, oil seeds, etc. to Australia. There is a likelihood of the expansion of India's trade with Australia.

Canada imports jute manufactures and tea mainly from India and exports motor cars and parts, locomotives, paper and paste-board, copper and wheat to India.

Ceylon, China, Indonesia, Argentina, Brazil, U.S.S.R., Iran, Iraq, Egypt, Turkey, etc. are the other countries with which India's trade is gradually increasing.

Trade with Pakistan—Pakistan occupies an important place in India's foreign trade. In 1948-49, Pakistan was the third most important source of imports and the second most important destination of India's exports.

Indo-Pakistan Trade

(in lakhs of rupees)

Exports		Imports	
Year	Amount	Year	Amount
1948-49	75.01	1948-49	109.29
1949-50	41.43	1949-50	44.04
1950-51	30.43	1950-51	43.87
1951-52	45.26	1951-52	87.50
1952-53	31.10	1952-53	21.88

India's principal items of import from Pakistan are raw cotton, jute, raw wool, food grains, fruits, salt, gypsum, chromite, sulphur and vegetables ; while exports to Pakistan constitute cotton piece-goods and yarns, jute manufactures, sugar, cement, steel, paper and coal.

Exports to and imports from Pakistan are regulated by the Indo-Pakistan Trade Agreement of 1951 whereby India imports from Pakistan raw cotton and jute, raw hides and skins and food grains, and exports coal, cotton textiles and yarn, chemicals, jute manufactures, tyres and tubes, leather and footwear, steel, cement, etc.

Land trade—Although the foreign trade of India is, for the most part, sea-borne, India has also a large trans-frontier land-route trade. India has an extensive land

frontier on the north-west and north-east. But trade in this direction has not much developed owing to the presence of inaccessible mountains and dense forests, absence of quicker means of transport and due to political reasons. There are only a few openings or passes and this makes communication with transfrontier countries difficult. The principal trans-frontier countries with which India has trade relations are Afghanistan, Central Asia, Iran, Nepal, Tibet, the Shann States, Western China, Thailand, etc. It is needless to point out that these countries present almost a 'virgin field' for exploitation by Indian manufacturers. The chief exports of India across the frontier are cotton piece-goods, sugar, yarns, metals and manufactured goods. Imports from the countries consist of fruits, wool, rugs and hides and skins.

QUESTIONS

1. Name the important commodities that enter into Indian Union's export and import trade. Suggest methods whereby greater self-sufficiency can be obtained in respect of commodities imported here.
2. What are the characteristic features of the foreign trade of India? What changes have taken place in the items of our exports and imports after the partition?
3. Describe briefly the main features of the Indo-Pakistan trade at present.
4. Examine the nature of the foreign trade of India and state the countries which participate in it.
5. What do you understand by the term "coastal trade"? Do you think India's coastal trade is very important?

CHAPTER IX

PORTS AND PRINCIPAL INDUSTRIAL AND COMMERCIAL CENTRES

Ports
in India.

India is a vast country of peninsular character with a coastline of over 3500 miles. Prior to partition, 98 p.c., of her foreign trade was sea-borne. For such a country, development of its ports and harbours is of vital importance. But, unfortunately, the coastline of India is unbroken and, as such, she has only a few major ports. Bombay, Cochin, Madras, Vishakhapatnam and Calcutta are the five major ports of India. The first three provide natural harbours. Madras has an artificial harbour. Calcutta is situated at the head of 1200 miles long river with wide range of tides. Kandla in Cutch is in the process of being developed as the sixth major port of India. The minor ports of India number 226 and they dot India's coast-line from Lakhpet in the Rann of Cutch to Chandbali in the Bay of Bengal. Under the constitution, the responsibility for major ports vests in the Central Government while all other ports are within the responsibility of the State Governments.

Principal ports of Indian Union

Alleppey is the premier port and Commercial Centre in Travancore and is situated about 35 miles south of Cochin. A canal connects the port with the interior back-water. The chief exports are copra, coconuts, coir fibre and matting, cardamon, ginger and pepper.

Bhatkhal in Mysore meets the needs of the State. A number of industries have grown up in this area.

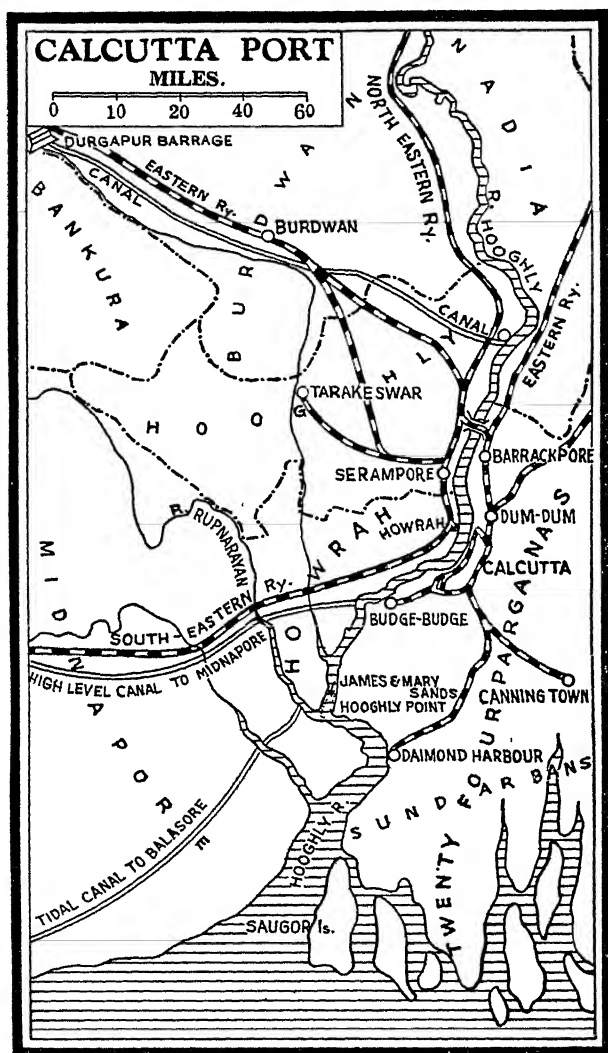
Bedi Bandar is the principal port in the State of Nowanagar.

Bhavnagar is situated on a creek several miles from the open waters of the Gulf of Cambay.

Bombay—See page 190.

Calcutta—See page 189.

Calcutta happens to be the main outlet for the major portion of northern India—from the Himalayas and Kashmir to the southern boundary line of the Indo-Gangetic



Plain. Assam, W. Bengal, Bihar, Eastern part of U.P. and M.P. form the hinterland of Calcutta. The network of major railways and inland steamship systems and the

availability of all necessary port and ware-housing facilities for a very large number of vessels simultaneously, her easy communication with the coal-mining areas, her predominant role as an industrial hub, the location of the jute-mill industry, the tea export trade—are all the positive and decisive factors that lie at the root of Calcutta's pre-eminence in the export trade of India. This pre-eminent position of Calcutta in India's export trade will be evident from a reference to the following comparative analysis of our foreign trade statistics :—

Calcutta's Export Trade

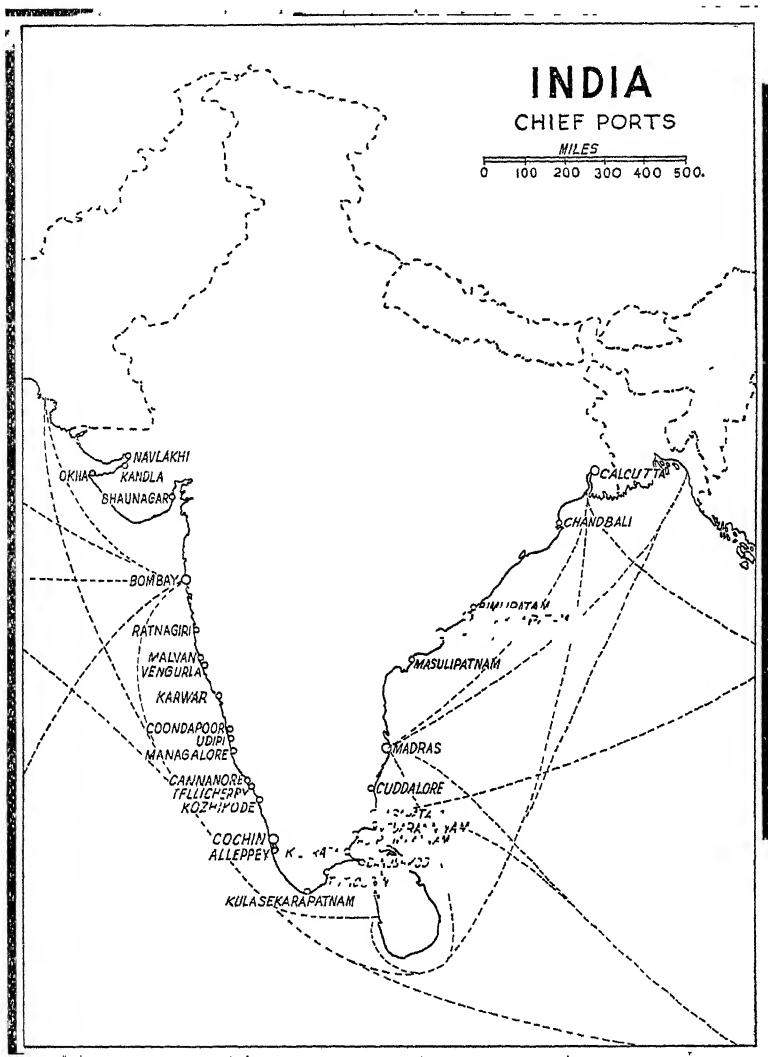
(value in crores of rupees)

Year	All-India	Amount	Share of Calcutta Port p.c of All India.
1945-46	272·5	130·6	47·9
1946-47	322·4	148·3	46·0
1947-48	404·8	240·6	59·4
1948-49	429·6	272·7	53·4
1949-50	486·4	256·0	52·9

Cochin.—Only recently Cochin has been raised to the status of a major port due to marvellous piece of engineering work completed in 1936. It is situated 90 miles south of Calicut and is also the most important port between Bombay and Colombo. The developments include the construction of a railway from the main land over a mile-long bridge to a reclaimed island, where modern wharves have been built. The port serves most of the trade and commerce of the Malabar Coast and Travancore-Cochin area. Its hinterland is rich in natural products, such as pepper, cardamons, tea, coffee, rubber, timber, coir, coir products and lemon grass oil.

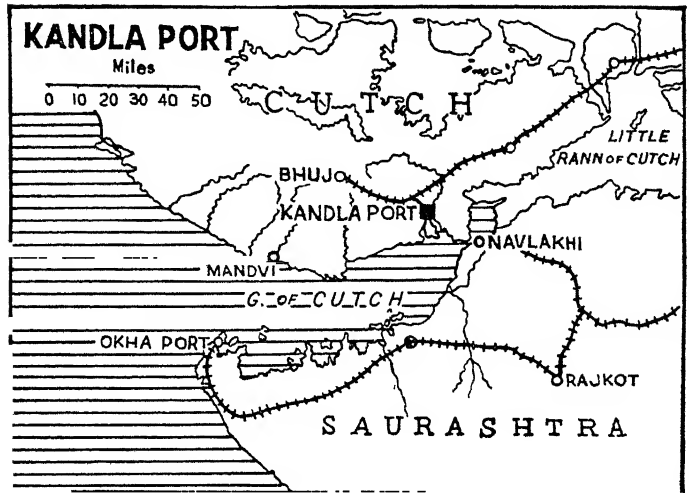
Calicut is 42 miles from Tellicherry and 90 miles from Cochin. The port remains practically closed during the south-west monsoon. The principal exports are coir, coir fibre, copra, coffee, tea, pepper, ginger, rubber, groundnut, raw cotton and fish manure.

Karikal was a French Settlement almost surrounded by Tanjore district. Rice, betel-nuts, matches, fire-works and Kerosene are the principal items of exports and import.



Kandla—The 1,000 mile long coast-line between Bombay and Karachi is without any major port. The vast hinterland of this area was previously served mostly by Karachi and partly by Bombay. The loss of Karachi after partition made the necessity of a big port more acutely felt. So in

1948 the Government of India accepted the recommendation of the West Coast Major Port Development Committee for developing Kandla, a small port in Cutch State on the northern shore of the Gulf of Cutch, into a major port.



Kandla Creek forms a good natural deep-water harbour. It is ideally situated from geographical point of view to replace Karachi in its service to hinterland and to relieve pressure on Bombay. Delhi is 656 miles from Kandla as against 783 miles from Karachi. The area is rich in natural resources and there are great potentialities for development of industries. To remove the difficulties of communication a metre-gauge railway line has been built upto Disha in the north of Bombay State on the Western Railway, about 174 miles distant. There will be four cargo berths for ships upto 600 feet in length, passenger berths for coastal traffic between Bombay and Karachi and for ferry services across the gulf, an oil berth for tankers upto 32,600 tons and a small concrete floating dock.

Mangalore is a tidal port served chiefly by back-water communication with hinterland. South Canara, Coorg and the Melnad districts of Mysore State comprise the hinterland of Mangalore. The chief exports through this port

are coffee, rubber, sandal-wood, rice, salt-fish, dried fruits, tea, pepper, and kasheew kernels.

Madras—See page 191.

Okha is situated at the extreme north-east point of the Kathiawar peninsula, readily accessible to all steamers tiding along the coast.

Pondicherry is situated on the Coromandal Coast, 104 miles south of Madras. It is the centre of the export trade in groundnuts from this former French territory and adjoining Indian districts to Marseilles.

Mormugao is situated on the eastern extremity of the Mormugao peninsula in Portuguese India. The port is open all the year round. It is a distributing port and its foreign exports consist of the produce of Bombay, Hyderabad and Mysore,—particularly manganese, groundnuts, cotton, coconuts, etc.

Tuticorin—It is the south-eastern terminus of the Southern Railway and a leading port of the Madras State. This port which is open all the year round, has, next to Madras and Cochin, the largest trade in Southern India. The harbour is shallow and steamers have to anchor 5 miles from the shore. Continuous dredging operation is necessary to keep the channel open between the shore and the roadstead. There is a very considerable trade with Ceylon in rice, pulses, onions, chillies and livestock for consumption in that island. Other articles of export are raw cotton, tea, cardamon etc.

Vishakhapatnam—Within recent years Vishakhapatnam has become a first class port. This town is partly sheltered behind the headland called the Dolphin's Nose. The S. E. Railway which serves these areas are offering favourable rates and the harbour has been built at a great cost. The agricultural and mineral products of Madhya Pradesh and Orissa were formerly shipped off at Calcutta or Bombay. At present, Vishakhapatnam offers better facilities to these areas than Calcutta, with regard to distance and charges. This port is connected with Raipur in the M.P. Thus

Vishakhapatnam is provided with a vast hinterland comprising Andhra, Orissa and Madhya Pradesh, served by a network of railways. This port, by competing with Calcutta, has taken away a large portion of the latter's traffic. It has become a major port of call for all ocean-going vessels and coastal traffic steamers. The traffic of the port of Madras has also been diverted, to some extent, to Vishakhapatnam. The principal articles of export from the port are manganese ore, bunker coal, tobacco, ground-nuts, myrobalans, oilseeds, hides and skins, and the chief imports are cotton-piecegoods, sugar, iron, timber and machinery. Exports are much larger than imports since the port does not serve any large consuming area.

It is now the seat of the ship-building industry in India. The ship-yard at Vishakhapatnam can build ocean-going vessels with a maximum length of 550 feet and a maximum carrying capacity of 12,000 tons cargo.

Towns, Industrial and Commercial Centres

Towns and inland trade centres of India have grown mostly in the Indo-Gangetic plain which is washed by the two mighty rivers—the Ganges and the Brahmaputra. The industrial centres are located either on the banks of these rivers and their tributaries or at the junctions of railways.

India has 73 cities with a population of 1,00,000 and over and about 3,000 towns spread all over Indian Union.

Distribution of Urban Population

	No.	No. of town-dwellers (in lakhs)	Urban population percentage
Cities ..	73	235	38·0
Major towns ..	485	186	30·1
Minor towns ..	1848	178	28·6
Townships ..	612	20	3·3
Total ..	3018	619	100·0

Descriptions of Important Trade Centres

Allahabad at the confluence of the Ganges and Jumna in Uttar Pradesh is an important commercial town and is

a great religious centre of India. The city is also a collecting and distributing centre of the State. Roads, railways and waterways—all converge together to this city, thus making the communication system perfect for commercial transactions. There are several oil mills, glass factories and flour mills here. Formerly, it was the capital of U.P.

Ahmedabad is the second largest city in the Bombay State. It is an important railway junction. It is 300 miles from Bombay. The principal industry of the city is spinning and weaving of cotton yarns. Indeed, next to Bombay, it is the greatest cotton manufacturing centre in India. The climatic conditions are more favourable in Ahmedabad than in Bombay for cotton manufacturing.

Amritsar—It is the most flourishing city in the Punjab and is famous for its carpets and shawls. The city is a centre of the Sikh religion and contains the Golden Temple. It stands on the Northern Railway and is 1,143 miles from Calcutta. Cotton mills are engaged in the manufacture of various kinds of textiles.

Asansol is an important industrial and coal mining centre of West Bengal. It is also an important railway junction on the Eastern Railway. Iron and steel plants of Burnpur and Kulti are located near Asansol. Near about it there are paper, aluminium, pottery and cotton textile industries.

Agra is a historical town on the Jumna and is an important trade and railway centre. The articles of trade are carpets, brass-wares, marbles, ivory, etc.

Aligarh in the U.P. is famous for its manufacture of locks and other brass-wares. Bangles and other glass wares and carpets are also manufactured. The dairy industry is rapidly developing and butter is exported from here in large quantities.

Bangalore in the Mysore State is the largest city, noted for the manufacture of carpet, cotton textiles, woollen goods and leather. Sandal oil is used in soap-making and medicine. Climate is healthy. It is 219 miles by rail from Madras.

An air-craft industry under the auspices of the Government of India has been established here. A great variety of manufacturing goods, such as cotton, woollen and silk goods, soap, furniture, porcelain, shellac, etc. are produced in this city.

Banaras situated on the Ganges, is the holy city of the Hindus and is an important commercial centre of Uttar Pradesh. It is noted for brass work, silk manufacture and jewellery industry.

Belgaum in the Bombay State is an important silk and cotton centre.

Baroda is an important educational centre and is noted for its cotton textile industry.

Batanagar on the Hooghly in West Bengal is noted for its boot and shoe-making industry.

Cuttack in Orissa is noted for manufacture of lac-bangles, shoes, toys and combs. It has also developed lumbering industry.

Chittaranjan, a newly-built town of West Bengal in the district of Burdwan, is noted for its recently—developed locomotive industry. The Workshop for the construction of locomotives has been set up here by the Central Government.

Delhi, the capital of India, is situated at the junction of nine railway lines. It is an important *clearing route* for E. Punjab and the western districts of U.P. in cotton, silk and woollen piece-goods. The city boasts of several cotton-spinning and weaving mills and flour mills. Ivory carving, jewellery work, lace works, pottery and gold embroidery are the artistic works. It is nearly 900 miles from Calcutta.

Dehra-Dun in the U.P. is noted for its Forest Research Institute and Military Training Centre. Its climate is very healthy.

Darjeeling is the summer capital of West Bengal and ranks next to Simla as the most important hill station in

northern India. It is noted for tea, oranges and cinchona which are the principal items of export. Recently some coal has been found around Darjeeling. A school for imparting lessons in mountaineering under the guidance of Sherpa Tenzing Norkay, the famous Conqueror of the Everest, has been founded here in 1954.

Digboi, an important oil-mining centre of India—is situated on the eastern extremity of the Brahmaputra Valley in Assam.

Dibrugarh, a river port of the north-western part of Assam, is on the Brahmaputra. Through this river port, timber, tea, orange, oil and kerosene of Digboi are exported to different parts of the country. The recent flood has washed away a large part of this town and has caused irreparable loss to the people and the State.

Gauhati is situated on the bank of the river Brahmaputra. It is the biggest river port, city and commercial centre of Assam. It has been connected by air-route with Calcutta. Before the partition of Bengal a great amount of tea, fruits, silk and silk products and timber would go to the different industrial centres of Bengal and to Calcutta port through the Brahmaputra. Now these are sent through land route.

Indore is the largest commercial centre of Madhya Bharat. It is noted for its cotton mills, flour mills, foundries, metal works and brass works.

Jamshedpur in Bihar is the seat of Sir Jamshedji Tata's iron and steel factory, which is the largest in Asia. The situation is ideal. The deposits of iron-ore are only 50 miles away and coal has to be brought only from a distance of about 100 miles. The requirements of limestone can be satisfied from the neighbouring regions. The Subarnarekha, although not navigable, supplies the water requirements of the industry. It is served by the Eastern Railway. The rapid expansion of the town is also due to the growth of a large number of industries connected with the steel industry.

Jubbulpore, on the Narbada in Madhya Pradesh, is an important railway centre. Near about, is the Narmada falls. It has cotton mills, cement and glass factories, and it is noted for its potteries also. Extensive manganese deposits occur in the neighbourhood.

Jodhpur in Rajasthan is noted for dyeing and printing cotton goods. Brass and iron utensils are also made here.

Jharia, in Bihar, is a coalfield town and is an important commercial centre.

Kanpur is a great collecting and distributing centre for Northern India. It is also an important railway junction and has the largest manufacturing industries in Northern India. Cotton pressing and ginning are the chief industries. The other factories include sugar mills, leather works, flour mills, iron foundries, chemical works, cotton mills and oil mills. From Calcutta, coal, raw cotton, wheat, kerosene, salt, tea, linseed and tobacco arrive here to be distributed in the interior regions. It is 634 miles from Calcutta.

Katni in Madhya Pradesh, is an important centre for utensils, grains and stones.

Kalimpong, a hill-station of West Bengal, is in the district of Darjeeling. Through this town a great amount of trade is carried on between West Bengal and Tibet. A great amount of raw wool and woollen products are imported from Tibet and salt and iron products are exported to Tibet. It is also a great commercial centre for woollen goods.

Lucknow is situated on the bank of the Gomati and is the junction of several branches of the former O. and T. Railways. Lucknow is the largest city of the U.P. and the fourth largest in India. Lucknow was once noted for the production of rich fabrics and costly jewellery. Cotton fabrics of all grades are still manufactured. The place is also celebrated for embroidery with gold and silver thread. Cotton printing is still a flourishing industry. There are a number of factories and railway workshops and iron

foundries. Lucknow is an important centre of education and literary activity in the U.P. The traffic is carried by the Eastern Railway.

Ludhiana in E. Punjab is a railway centre. It has cotton mills and is the centre of hosiery-making industry.

Laskar, the capital of Gwalior State, contains a number of factories and is the centre of an important stone quarrying and carving industry. Tobacco cultivation is developing and also cigarette-manufacturing is carried on here.

Moradabad is a railway centre in U.P. and is noted for its plain and ornamental brass wares.

Murshidabad on the Bhagirathi in West Bengal, was the capital of Bengal during the Mughal period. It is an important centre of sericulture and is also famous for brass wares.

Mirzapur in Uttar Pradesh is noted for lac industry and manufacture of domestic utensils made of brass. There is also a carpet industry.

Madura is an important religious centre of South India. It is a centre of silk and cotton weaving and dyeing industries and is one of the leading industrial centres of Madras.

Nagpur is the leading industrial and commercial town of Madhya Pradesh. It is situated at the junction of the former G. I. P. and B. N. Railways. It is noted for cotton trade. There are extensive manganese deposits in the neighbourhood. It is also famous for oranges. It has spinning and weaving mills, cotton ginning and pressing factories and other industries.

Patna, the capital of Bihar, is a railway junction, a commercial town and a collecting centre of agricultural products.

Puri, pleasantly situated on the sea-coast, is a holy city of the Hindus in Orissa. It is noted for the manufacturing of brass wares, silver and gold ornaments and shoes.

Quilon in Travancore, has been a trading centre from very early times and is now an important port for the export of coconut, oil, coir, mats, timber and fish. It has some cotton mills.

Srinagar, the capital of Kashmir, is situated on the Jhelum. It is famous for its embroideries and carved wood work. It has silk and woollen industries.

Surat is a town in Southern Gujerat, near the mouth of the Tapti river. Once an important port, it is now famous for gold and silver thread-making industry. Cotton manufacture is also important.

Sambalpur is an important silk and cotton weaving centre in Orissa.

Simla, a hill station in the Punjab, is the summer capital of the Government of India. It has trade with Tibet.

Sindri is situated near Dhanbad within the coal-belt of Bihar. Its adjoining area is also noted for gypsum, the most important raw material for fertiliser and chemicals. Here the biggest fertiliser factory in Asia has been developed. In recent times a great amount of cement and chemicals are also produced here.

QUESTIONS

1. Write an account of the economic products of either the hinterland of Calcutta or the hinterland of Bombay.
2. Comment on the proposal of connecting Calcutta Port with the sea by a ship canal. Mention the disadvantages of ship canals.
3. In a town planning scheme, what geographical factors should be taken into consideration? Suggest two areas in West Bengal which could be developed into new towns.
4. How is the importance of the port of Calcutta likely to be effected by the development of the ports of Chittagong and Chalna?
5. How far would it be correct to say that Calcutta is one of the most expensive ports in the world? State the advantages if any, in connecting the port of Calcutta with the sea by a "ship canal".

6 Analyse the advantages and disadvantages of Calcutta as a harbour and port. What measures would you suggest to remove the disadvantages? To what extent has the importance of Calcutta been affected by the partition of Bengal?

7. What is meant by "Costal Shipping"? Name the ports of importance in India's coastal trade and state the position of the shipping companies in the coastal trade of the country?

8 Does Calcutta possess advantages for being situated on the river Hooghly? Give an idea of the hinterland of this port and the principal articles of export and import.

9. Discuss the commercial importance of any five of the following :—Jubbulpur, Jharia, Dibrugarh, Narayanganj, Bangalore and Amritsar.

10. State the hinterlands of the ports of Chittagong, Calcutta and Karachi. Also mention their principal articles of export.

11 State briefly the commercial importance of any five of the following :—Jamshedpur, Jubbulpore, Nagpur, Patna, Surat, Asansol, Banares, Bangalore.

12 Name the four ports of importance which a ship may touch on a coastal voyage from Bombay to Calcutta. Also state the principal articles exported from these ports.

13. State the reasons for the growth of any five of the following :—Calcutta, Bangalore, Digboi, Asansol, Jubbulpur, Kalimpong, Kanpur, Surat, Cuttack, Banaras.

14 Describe the location of Calcutta and the advantage it has given it in the development as a sea port.

15. What are the major and minor ports in India? Give some examples of each. What steps are proposed to be taken for the development of ports in India?

16. Describe briefly the commercial importance of the following :—Baroda, Delhi, Kanpur, Ahmedabad, Cochin, Jalpaiguri and Dibrugarh.

17. Discuss the commercial importance of any four of the following :—(i) Nagpur, (ii) Gorakhpur, (iii) Asansol, (iv) Ahmedabad, (v) Cochin, (vi) Dibrugarh, (vii) Sindri.

CHAPTER X

ECONOMIC GEOGRAPHY OF WEST BENGAL

Area & Population.

State of
W. Bengal

The State of West Bengal was formed as a result of the partition of Bengal into two separate States, namely, West Bengal and East Pakistan, on the 15th August, 1947.

Area and
population.

West Bengal is the smallest among the A Group States under the Republic of India. The total area of the State is about 30,779 square miles, or 36 per cent of the area of undivided Bengal. The only Indian State that has merged with West Bengal (on the 1st January, 1950) is Cooch Bihar which adds 1,318 square miles to her territory. The former French Colony of Chandanagar with an area of 4 square miles and a population of 49,909 merged with this State on the 2nd October, 1954. The State comprises two separate unconnected units—the one in the north, bounded on the east by Bhutan, on north by Sikkim, on the west by Nepal and Bihar and on the south by East Pakistan, while the southern unit is bounded on the north and east by East Pakistan, on the west by Bihar and Orissa and on the south by the Bay of Bengal. The State contains a population of 2,48,60,217. This is one of the most densely populated states of the Indian Union, with a density of 896 persons per square mile.

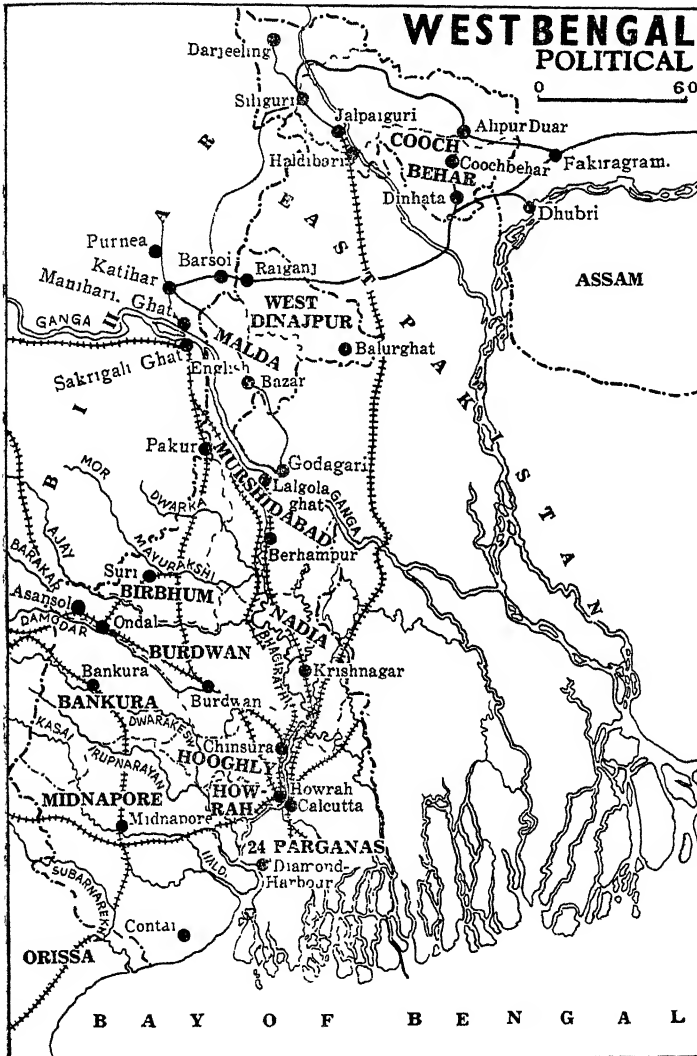
Physical Divisions—West Bengal can be divided into the following divisions :—

Relief.

1. The districts of Burdwan, Birbhum and Bankura belong to the Eastern portion of the Chotanagpur plateau. This region is built up of harder rocks. This region is rich in minerals like coal, iron, copper and mica. The Damodar, Mor and Subarnarekha rise from the hills of this plateau.

2. The Himalayan region in the north. It is formed of softer rocks. Some amount of lignite and bituminous

coal is found here. Some of the perennial rivers of West Bengal rise from this mountainous region.



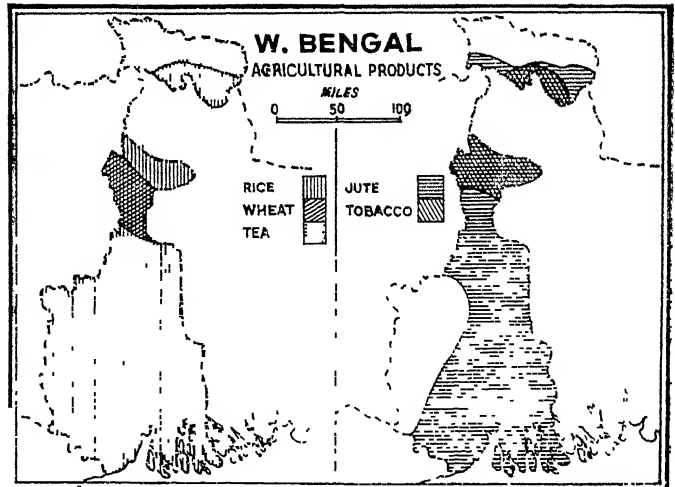
3. The River Plain in the south, built up of sediments brought down by the river Ganges and its tributaries. The soil of this plain is highly fertile and is ideally suitable for production of a great variety of agricultural crops.

Climate. *Climate*—West Bengal has a tropical climate with rainfall ranging between 60 inches in the plains to more than 120 inches in the hills. The rainfall is caused by the south-west monsoons and maximum rain falls during the summer season. The western part of West Bengal has more or less a continental type of extreme climate with high temperature in the summer months and low temperature in winter months.

Rivers. *Rivers*—The State is washed by a good number of big and small rivers. The Ganges, the Hooghly, the Damodar, the Mor, Subarnarekha, Rupnarayan, etc., are the principal rivers of the State. These rivers play very important part in the economic life of West Bengal.

Forests. *Forests*—The State is more or less devoid of forests. The forest region of West Bengal is situated in the isolated northern part of the State, in the districts of Darjeeling and Jalpaiguri and in the deltaic belt of the Presidency Division. Forests cover about 9 per cent of the total area of the State.

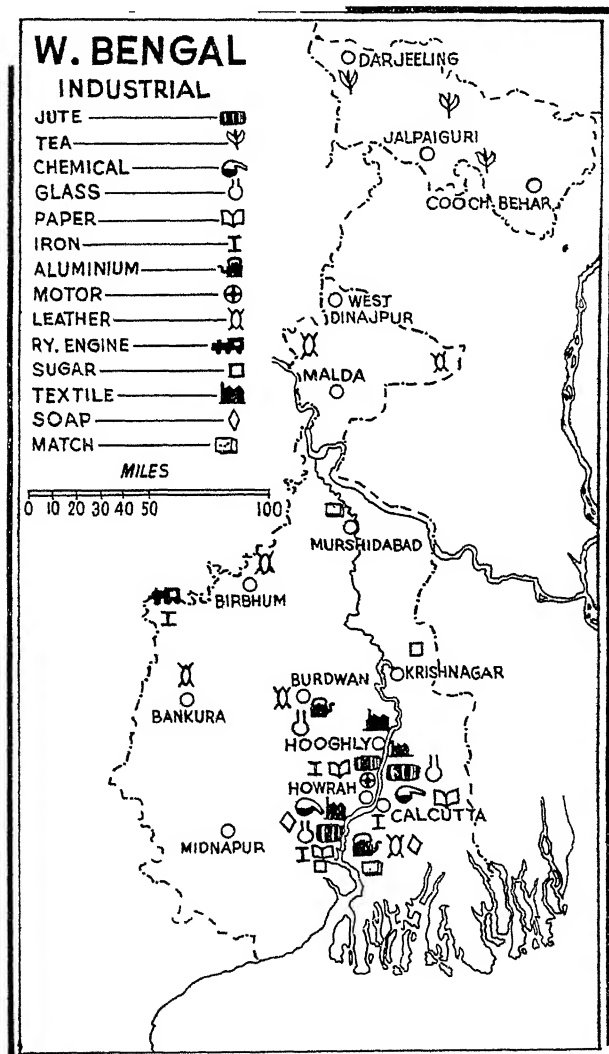
Agriculture *Agricultural Products*—Agriculture is the principal occupation of the people of the State. The fertile soil and



favourable climate account for this preponderance of agriculture. West Bengal has the third largest area under rice in the Indian Union, the second in tea and the first in jute.

Wheat, sugarcane, tobacco, potato, oilseeds, cotton, maize, gram, barley and cinchona are also grown here. About 98 per cent of the total cropped area is under rice and jute alone.

Industries—West Bengal is the most highly developed industrial State in India. Availability of raw materials,



coal and labour, satisfactory system of transport and facilities of the port of Calcutta, and advantages of highly developed banking and credit system—all these factors have combined to make the State an industrially developed one. The principal industries of the State are jute, cotton, paper, chemicals, iron and steel, sugar, ceramic, etc. Nearly 40 per cent of the industrial units of Indian Republic are located in this State.

Trade and Commerce. The internal and foreign trade of West Bengal is highly developed. The State exports jute and jute goods, hides, and skins, cotton goods, forest products, etc. to foreign markets through the port of Calcutta. Iron and steel goods, chemicals, drugs and medicines, paper, etc. are the principal imports of the State. Some amount of trade is also carried on with Nepal and Tibet through the mountain passes in the north.

Cottage Industries. West Bengal's cottage industry is also of considerable importance, the most important of which is cotton and silk weaving. Bell-metal and hand-made paper are the two other important cottage industries of the State.

Transport System.—The transport system of West Bengal is efficient and moderately satisfactory. The State has a number of navigable rivers. Roads, railways and airways are also comparatively well-developed. West Bengal has 2,462 miles of metalled and 2,652 miles of unmetalled roads.

River-Valley Projects. The Damodar Valley Project and the Mayurakshi Reservoir Project are the two principal river-valley projects of the State, the main objects of which are to speed up industrialisation and improve agricultural economy.

QUESTIONS

1. Take any district of West Bengal and describe fully its economic geography.
2. Write an account of the economic geography of West Bengal with particular reference to its jute industry.

CHAPTER XI

ECONOMIC GEOGRAPHY OF PAKISTAN

Introduction—The Dominion of Pakistan came into being on the 15th August, 1947, until which date it formed Pakistan a part of India. The following regions of undivided India were ceded to form this newly-created Sovereign State.

1. West Punjab (Lahore, Rawalpindi and Multan Divisions of undivided Punjab), Sind, Beluchistan, and N. W. F. Province to form West Pakistan.
2. The whole of Chittagong and Dacca Divisions—the districts of Rangpur, Bogra, Rajshahi, Pabna of Rajshahi Division and Khulna of Presidency Division, parts of the districts of Jalpaiguri, Malda, Dinajpur, Nadia and Jessore, and greater part of Sylhet district of Assam province.
3. Bahawalpur, Kelat, Khairpur, Las Bela, Kharan, Chitral, Din, Swat, Amb and Phulera.

On 23rd March, 1956, the Dominion adopted its Constitution and declared itself the Islamic Republic of Pakistan, consisting of two political units, namely, Western Pakistan comprising West Punjab, Sind, Baluchistan and N. W. F. Province, and the unit of East Pakistan.

Area and Population

The total area of Pakistan is 364, 737 square miles. This is about 29 per cent of the total area of undivided India. The country is almost equal in size to that of the U. K. and France taken together.

Provinces	Area in square miles	Percentage of the total area
1. Eastern Pakistan	54,501	14.9
2. Western Pakistan	2,04,882	56.1
(i) West Punjab	62,245	
(ii) Sind	50,397	
(iii) N.W.F. Province	14,263	
(iv) Beluchistan	54,456	
(v) Bahawalpur	17,471	
(vi) Khairpur	<u>6,050</u>	
3. Kalat and other native States	1,05,354	29
Total	<u>3,64,737</u>	<u>100</u>

Area and population.

The total population of Pakistan, according to 1951 census, is little over 75 million. About 92% of this population live in villages and over 75 per cent are Muslims. The density of population per square mile is 208. Pakistan ranks fifth among the largest countries of the world in respect of population, being preceded by China, India, Russia and the United States of America. It contains the largest Muslim population in the world.

Provinces	Population (000)	Density per sq mile	Percentage of the total population
1. Eastern Pakistan	4,20,63	777	55.4
2. West Punjab	1,88,28	302	24.8
3. Sind	46,08	91	6.0
4. N.W.F. Province	32,53	240	4.2
5. Beluchistan	6,22	11	.8
6. Bahawalpur	18,23	104	2.4
7. Khairpur	3,20	53	.4
8. Kalat and other native States	43,25	41	6.0
	<hr/> 7,58,42 <hr/>	<hr/>	<hr/> 100 <hr/>

The most noticeable feature in this connection is the uneven distribution of population between the two wings of Pakistan. Eastern Pakistan comprising only about 15 per cent of the total area of the Republic, is inhabited by as large as about 56 per cent of the total population with a density of over 775 persons per square mile, while the whole of Western Pakistan, comprising about 85 per cent of the total area of the country contains only 44 per cent of its population with the resultant low density of only 109 persons per square mile on an average.

Natural Divisions—Pakistan may be divided into six clearly marked natural regions :—

Western Pakistan—(1) Mountainous region of the north-west. (2) Dry plateau in Beluchistan. (3) Arid plains of Sind and the West Punjab. (4) Deserts of Sind. Relief.

Eastern Pakistan—(5) The Ganges-Brahmaputra plains. (6) Wet lowlands of the coastal areas.

1. *The Mountainous Region of the North-West* includes the North-West Frontier Province and the adjoining districts of the West Punjab. The rainfall here

is scanty and the average annual rainfall nowhere exceeds 20".

Agriculture could not be developed due to insufficient rainfall, infertile soil and unsuitable climate. Wheat, gram, millets and barley are produced in the areas where irrigation has been introduced.

2. *The Dry Plateau* covers the whole of Beluchistan which is outside the influence of the monsoon. The climate is extreme and the rainfall is scanty and uncertain. Economically the area is very undeveloped and uninhabitable. The population is quite sparse. In some of the areas millets, wheat, barley and fodder are grown with the help of Karez irrigation. Fruits are extensively grown and form the bulk of exports.

3. *The Arid Plains* comprise the valleys of the Indus and its tributaries in Sind and the West Punjab. The average annual rainfall in this region is between 10 to 20 inches. Irrigation has been extensively introduced in this area, specially in the western part of the Plain. Cotton, wheat, sugar-cane, oilseeds, rice and barley are the principal agricultural products of this region.

4. *The Deserts* encompass the eastern part of Sind. The region covers the western part of the *Thor* desert. The rainfall is extremely scanty and hardly exceeds 5". Small quantities of wheat, cotton and gram are grown with the aid of irrigation.

5. The Ganges-Brahmaputra Plains include the eastern and northern parts of Eastern Pakistan. The region is entirely within the influence of the monsoon, and, as such, gets copious rainfall. It is drained by a large number of silt-bearing rivers. Certain abundant rainfall, fertile alluvial soil and the plain character of the country have contributed to agricultural development of Eastern Pakistan. Agricultural prosperity has made the region the most densely populated. Jute, rice, tobacco, tea, cotton, coconut, betel-nut and pulses are the principal agricultural crops.

6. *The Wet Lowlands of the coastal Areas* cover the deltaic region formed by the Ganges and the Brahmaputra. The monsoon winds cause heavy rainfall in these areas and

these are also watered by a number of silt-carrying rivers. The region is mostly covered by dense forests of evergreen trees and is known as the *Sundarbans*. The forest products of this region, though not yet fully exploited, are of high economic value. Some of the areas are now being systematically deforested and agriculture is being practised there. Jute, rice, tobacco, sugar-cane, bamboo, coconut and betel-nut are the principal crops of these areas.

Irrigation—Agriculture is the principal occupation in both the wings of Pakistan. But the rainfall in Western Pakistan is scanty and there it is nowhere more than 20 inches. Hence the importance of irrigation in Western Pakistan cannot be exaggerated.

Western Pakistan enjoys a very highly developed system of irrigation. About 28 per cent of the total irrigated areas of undivided India are now included in Western Pakistan and about 35 per cent of the total cultivated area of Pakistan and more than 60 per cent of such areas of Western Pakistan are under irrigation.

Irrigation has been most widely extended in the Western Punjab where the relief and the great river system with a perennial flow of water have made the region most ideal for the development of canal irrigation. The network of the snow-fed Indus and its tributaries waters this region and so it is rightly said to be a canal colony. The flat and soft alluvial soil of the Western Punjab and Sind has been helpful for development of irrigation. But for the extension of the irrigational facility the otherwise semi-desert tracts of the two provinces would have remained uncultivated. In Western Punjab alone about 14 million acres of land are cultivated with the aid of irrigation.

Irrigation System of Western Pakistan

1. *The Lower Chenub Canal* is the greatest canal in Pakistan. It takes water from the Chenub at a place called *Khamki* where a great weir has been built across the river. The canal alone irrigates more than 2 million acres of land and has converted the semi-desert tracts of Lyallpur, Montgomery, Sheikhpura and Gujranwala into agriculturally rich and thickly populated areas.

W. PAKISTAN

Irrigation

MILES

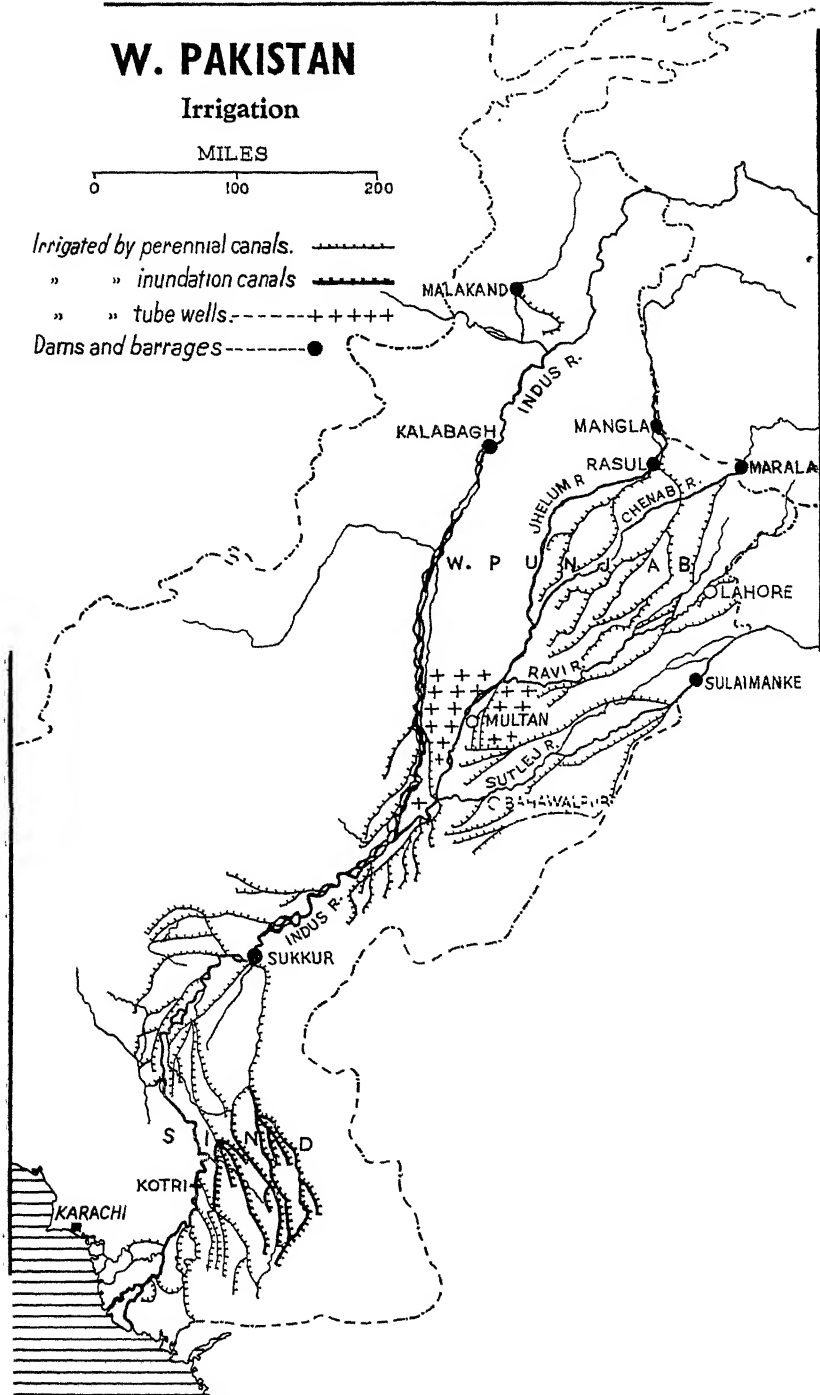
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Irrigated by perennial canals. ————

" " *inundation canals* - - - - -

" " *tube wells* - - - - - + + + + +

Dams and barrages ———— ●



2. *The Lower Jhelum Canal* takes its water from the river Jhelum at Rasul and irrigates about 9 lakhs acres of land in the district of Gujrat, Shahpur and Jhang in the North-West Punjab.

• 3. *The Upper Chenub Canal* derives water from the Chenub at Meralat at the foot of the Himalayas and joins the Lower Bari Doab Canal at Balloki on the Ravi. The canal irrigates extensive areas in the districts of Sialkot, Sheikhpur and Gujranwalla.

4. *The Upper Bari Doab Canal* takes off at Madhopur on the Ravi and passing through Amritsar district in the Indian Union, irrigates Lahore, Gurdaspur and Montgomery.

5. *The Triple Canal Project* connects (1) the *Upper Jhelum Canal*, (2) the *Upper Chenab Canal* and (3) the *Lower Bari Doab Canal* and irrigates more than 15 lakh acres of land in the districts of Multan and Montgomery.

Irrigation System of North West Frontier Province

1. The Swat System of this province alone serves about 70 per cent of the total irrigated area. The canals which derive water from the Swat irrigate more than 400,000 acres of land in N.W.F.P.

2. The Warsak Multi-purpose Project is also expected to irrigate vast areas in the district of Peshawar and in the tribal areas.

3. The Thal Project comprising a dam across the Indus near Kalabagh will irrigate large cultivable areas in the district of Mianwali.

The Lloyd or Sukkur Barrage Scheme in Sind, providing the largest irrigation canal in the world, being about 74,000 miles in length, supplies perennial irrigation to nearly six million acres or about 75 per cent of the total sown area in the province. The Scheme comprises a great dam across the Indus at Sukkur. Apart from this Scheme, the Upper Sind has three canals, namely, (1) the Desert Canal, (2) the Begari Canal and (3) the Unhar Wah Canal,

and the Lower Sind has two canals, namely, (1) the Karachi Canal and (2) the Fulehi Canal.

The *Karez* system of irrigation is practised in Beluchistan. By this method, water is drawn from underground springs.

The Eastern Pakistan being under the influence of monsoons, gets copious rainfall and, as such, needs no irrigation for successful cultivation. The Province is drained by innumerable rivers and rivulets and there is no irrigation system there.

Agriculture

General
Survey

Agriculture is the mainstay of Pakistan. About 92 per cent of the total population depends on agriculture. Fertile soil, favourable climate and abundant rainfall in the Eastern Pakistan and extensive system of irrigation in the Western Pakistan have rendered the country eminently fitted for agriculture.

Little over one-third of the total area of the country is under cultivation. Foodgrains are the most important agricultural products. About 85 per cent of the total cultivated area is under foodgrains. Of this area, about 66 per cent is devoted to production of rice. Jute, cotton, wheat, tobacco, oilseeds, tea, pulses and sugarcane are the other principal agricultural crops.

Eastern
Pakistan

In agricultural development Eastern Pakistan is far more advanced than Western Pakistan. Plain land, rich alluvial soil, favourable climate, certain and abundant rainfall and availability of cheap labour have all contributed towards agricultural prosperity of the eastern wing of Pakistan. Rice, jute, tea, tobacco, pulses, sugarcane, coconut and betelnut are the principal produce of Eastern Pakistan. About 100 per cent of jute and 88 per cent of rice grown in Pakistan is produced in the Eastern Pakistan.

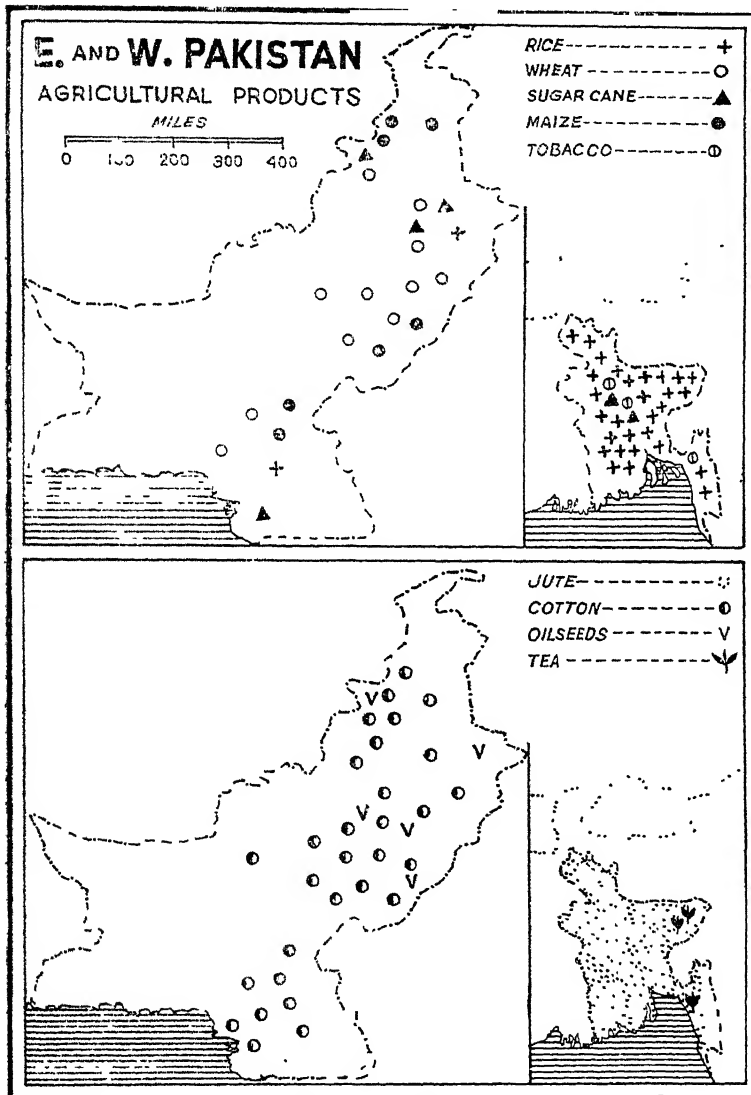
Agriculturally Pakistan is not only self-sufficient but has an exportable surplus in jute, cotton and wheat.

Wheat
Producing
areas.

Wheat—About 10 million acres or 7 per cent of the total cultivated area is devoted to production of this crop.

It is the staple food of Western Pakistan and is the second most important food crop produced in Pakistan.

Wheat is grown in West Punjab, Sind, N.W.F. Province and in the States of Bahawalpur and Khairpur. The



districts of Attock, Sialkot and Muzaffargarh in the West Punjab are noted for production of wheat. Small quantities of wheat are raised in the districts of Rajshahi, Pabna, Malda, Dinajpur and Kusthia in Eastern Pakistan.

Rice
Producing
areas.

Rice is the most important foodgrain in Pakistan and is the staple food of the people of Eastern Pakistan. About 23 million acres of land are under rice with a total annual output of about 9 million tons. Of this East Bengal alone accounts for nearly 90 per cent of the total cultivated area and annual yield. In Eastern Pakistan rice is grown in every district where about two-thirds of the cultivated areas are under this crop. But as it is the staple food in East Bengal, local production is not sufficient to meet the requirements of the people, while Western Pakistan with its meagre production sends its exportable surplus to East Bengal.

Maize

Maize is extensively grown in Sind, West Punjab and N.W.F.P. It is grown in Sukkur and Hyderabadabad in Sind and in Rawalpindi, Attock, Jhelum, Gujrat, Sialkot and Gujranwala in West Punjab.

The other foods crops of Pakistan are barley, gram and pulses.

Jute
production

Jute—Nearly ninety per cent of the total output of jute in undivided India used to come from the areas now included in Eastern Pakistan. At present Eastern Pakistan supplies about 75 per cent of the total world production of this useful fibre crop. Two million acres of land in East Bengal are devoted to jute production with an annual yield of seventy-million bales of 400 lbs. The district of Mymensingh alone accounts for more than 70 per cent of the total production. The other jute-growing districts are Noakhali, Tipperah, Dacca, Pabna, Bogra, Rangpur, Faridpur, Rajshahi, Barisal and Sylhet.

Jute is the most important cash crop in Eastern Pakistan. The jute mill industry is quite undeveloped there as yet and as such the bulk of the total output is exported outside, notably to Indian Union.

Tea—It is an important product in Eastern Pakistan. Though the yield of tea is not quite satisfactory in Pakistan ^{Tea.} a substantial quantity of it is exported due to very low internal demand. Pakistan produces about 50 million lbs. of tea annually of which more than 35 million lbs. are exported. The United Kingdom alone imports about 30 million lbs of tea exported by Pakistan.

Sugar-cane—The cultivation of sugarcane is mainly confined to West Punjab and East Bengal. Lahore, Sialkot, Lyallpore and Montgomery in West Punjab and Dinajpur, Rangpur, Kusthia, Dacca and Mymensingh in E. Bengal are ^{Sugar cane} the sugarcane producing areas in Pakistan. It is grown in little over 600 thousand acres of land and the annual output is about 900,000 tons. The position of the Republic in sugar industry is not satisfactory and the country produces only 25000 tons of sugar annually, while its requirement, inspite of present low consumption, is much more than this quantity. The country has, therefore, to depend on import of sugar, mostly from Indian Union.

Cotton—It is the most important cash crop of Western Pakistan. Nearly 20 per cent of the cotton growing areas ^{Cotton.} of undivided India are included in Pakistan, and as the cotton textile industry is not well developed there, four-fifths of the country's production of cotton are available for export—mostly to the Indian Union. Over three million acres of land are under cultivation of cotton with an annual yield of 1·4 million bales of 400 lbs. each.

Western Pakistan raises more than 85 per cent of the total production of cotton in Pakistan. Lyallpur, Lahore, ^{Cotton} Multan, Montgomery, Shahpur and Sheikhpura in West ^{Producing} Punjab, Thatparker, Hyderabad and Nawabshah in Sind ^{areas.} and the States of Bahawalpur and Khairpur are the important cotton tracts of Western Pakistan. Small quantities of cotton are also produced in N.W.F. Province and in the districts of Dacca, Mymensingh and Chittagong in East Bengal.

Oilseeds—Pakistan's position in respect of oilseed production is not very satisfactory. Rape-seed, linseed, cotton-

Oilseeds. seed, groundnut, castor seed and sesamum are the principal oilseeds grown in Pakistan. These are grown in about 2 million acres of land.

Castor seed is grown in Sind, sesamum in East Bengal, rape seed and mustard seed in Sind and West Punjab, and linseed in East Bengal, West Punjab and N.W.F. Province. Cotton seed is produced in Western Pakistan. In the production of cotton seeds, the position of Pakistan is satisfactory and she has an exportable surplus.

Tobacco. *Tobacco* is an important agricultural product of Pakistan and the position of the country is satisfactory in the production of this crop. Nearly 400,000 acres of land are under cultivation of tobacco and the total annual yield is about 160,000 tons.

Tobacco is chiefly grown in E. Bengal which alone raises about 80 per cent of the country's total production. Rangpur, Dinajpur, and Chittagong Hill Tracts are the principal tobacco growing areas. Some quantities are also grown in Sind, West Punjab and N.W.F. Province.

Silk. *Silk*—The principal areas of silk production in Pakistan are the districts of Rajshahi, Rangpur and Bogra in East Bengal.

Forests. *Forests* cover about 6 million acres of land or little over 5 per cent of the total land area of Pakistan.

Of the total forest area of Pakistan, East Bengal alone accounts for more than 40 per cent. Next come West Punjab and Beluchistan which, between themselves, possess another 40 per cent. Sind and West Punjab are arid areas, and hardly 2 per cent of the total areas of these provinces are covered by forests.

Forest products. The coastal areas and Chittagong Hill Tracts have considerable forests. Gurjan, Gamari, Sundri, Bamboo, Wild Mangoes and Betel-nut are the principal products of these forest areas. Of these, the first three are used for making boats and manufacturing packing boxes, while bamboo is commonly used for framework, walls and roofs.

Babul and Blue Pine are the principal timber-yielding trees of Western Pakistan, grown in the provinces of Sind, West Punjab and Beluchistan.

Fisheries—Fish is an important source of food in Pakistan, and the fishing industry is of great importance to the people of Dacca and Faridpur in Eastern Pakistan and of Sind in Western Pakistan. Recently industries relating to manufacture of manure, oils, etc. from fish have been started in Sind. Fisheries.

The Inland Fisheries are carried on in both the wings of Pakistan. The Indus and the tributaries in Western Pakistan and the Ganges and other innumerable rivers in Eastern Pakistan provide great facilities for such fisheries. *Inland Rahu, Katla, Mrigel, Hilsa, prawns*, etc. are the principal catches of river fisheries, while *bils* and tanks of East Bengal abound with fish like *Kai, Magur, Singi*, etc. The whole output of fresh-water fisheries are locally consumed and East Bengal sends some quantities of fish to the adjacent areas in the Indian Union. Coastal-fisheries are concentrated along the coastal areas of East Bengal, Sind and Beluchistan. Mulletts, Salmon, Prawn, Pomfret, Mackarel, Hilsa, Jew Fish, etc. are some of the principal catches of sea fisheries. Sind exports large quantities of fish in sun-dried and salted condition. With the improvement in the method of preservation on scientific lines and with the development of manufacturing fish products, there will be further expansion of coastal fisheries in Pakistan. Inland fisheries.

Fresh-water fisheries on small scale are carried on in West Punjab and N.W.F. Province.

Animal Products—Natural conditions of Pakistan are suitable for rearing of animals. Cattle, Buffaloes, sheep, goats, camels, horses, and mules are the important animals available in Pakistan.

Cattle-wealth of Pakistan is quite considerable. The Republic possesses 55 million cattle. Eastern Pakistan's share of this wealth is greater than that of the Western counterpart. But the quality of the cattle of East Bengal is much inferior to that of West Punjab. Cattle.

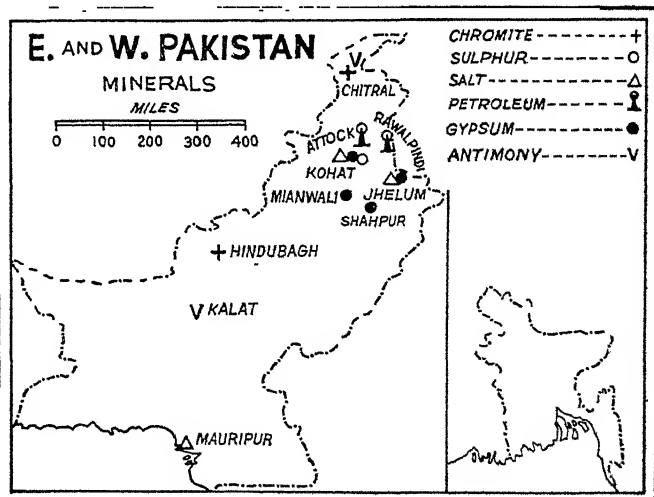
Sheep Pakistan rears about 7 million sheep for mutton and wool. Sind, N.W.F. Province, West Punjab and Beluchistan are the principal sheep-rearing areas in Pakistan.

Buffaloes Buffaloes of good quality are found mostly in West Punjab.

Camels Sind and Beluchistan support a large number of camels. Horses are reared in Sind, West Punjab, Beluchistan and N.W.F. Province. These render valuable services as beasts of burden in those regions where other means of transportation have not been satisfactorily developed. Goats are extensively reared in Eastern Pakistan.

Animal Products Milk, wool, hides and skins are the principal animal products of Pakistan. The Republic has developed export trade in raw hides and skins, wool and dairy products. The U.K. and U.S.A. are the important buyers.

Minerals *Mineral Products*—Pakistan is not rich in mineral wealth. Of the varied and abundant mineral resources of undivided India, Pakistan received considerable quantities



of sulphur and chromite, some quantities of salt, gypsum, antimony and petroleum, and practically no other valuable mineral product. The absence of coal, iron ore, copper,

mica, bauxite and manganese has adversely affected her attempts at industrial development. The country will naturally remain dependent on the Indian Union for supply of these essential minerals, unless and until proper surveys and intensive investigations of her hitherto unexplored areas offer promising fields for discovery and exploitation of minerals of industrial importance.

Eastern Pakistan is particularly poor in mineral wealth. There are prospects of obtaining coal in Chittagong Hill Tracts and oil in Chittagong and Sylhet.

Chromite—Pakistan is an important chromite-producing country in the world. It is available in Hindubagh in Beluchistan and in Chitral and N.W.F. Province. Pakistan possesses more than 80% of the deposits of this mineral of undivided India. Most of the output is exported.

Sulphur is found in large quantities in the Kalat State and Kohi-Sultan mountain in Baluchistan, and in the West Punjab and N.W.F. Province.

Salt—Pakistan is rich in salt, particularly in rock salt. Rock salt is found in the Khewra Salt mines in West Punjab and in N.W.F. Province. Common salt is manufactured in the coastal areas of Sind.

Petroleum is the most important of all the mineral resources of Pakistan. About 15 per cent of the total output of undivided India has gone to Pakistan. The north-western region of Western Pakistan is the only important oil-bearing area in the country. The Khaur and Dhulion oilfields in the district of Attock in West Punjab are the two fields now being worked. Investigations are being conducted to trace oil deposits in Chittagong Hills in East Bengal.

Gypsum—Pakistan raises little over 50 per cent of the total output of gypsum of undivided India. It is found in Jhelum, Shahpur and Mianwali in the West Punjab, and also in Sind, Baluchistan and N. W. F. Province.

Fireclay—It is obtained in Dera Ismail Khan in West Punjab. Ochre and other coloured clays are found in Sind and Chitral.

Antimony—Pakistan possesses large reserves of this important mineral in the States of Chitral and Kalat, but due to inaccessibility of the areas where these deposits occur these could not be usefully exploited as yet.

Power Resources—The position of Pakistan in respect of power resources is not at all satisfactory. This has, to no small extent, hindered the development of industries in the Republic and this deficiency in power resources will continue to hinder growth of industries for many more years to come.

Coal. The country is positively deficient in coal. Pakistan's annual requirements of coal amount to more than 3 million tons, while her production barely exceeds 300,000 tons. The deficit is partly made good by import from the Indian Union. Coal of inferior quality is found in Beluchistan, N.-W.F.P., West Punjab and Chittagong hill tracts.

Petroleum. Pakistan's production of petroleum too falls short of her requirements. Mineral oil is raised at Khaur which is refined at Attock.

The deficiency of coal and petroleum brings into bold relief the imperative necessity of developing hydro-electric power in Pakistan in the interest of industrial progress and economic prosperity of the country. The potentialities for development of hydro-electric power are great and several schemes are under active consideration. A number projects have been planned, and work on some of them has already been started.

Hydro-electricity. The *Karnafuli Project* in East Bengal is envisaged to harness the waters of the river Karnafuli. The project aims at producing 60,000 K.W. of electrical energy.

The Rasul Hydro-electric Scheme in West Punjab is expected to generate over 20,000 K.W. of energy. Work on this scheme has already been started.

The Warsak Project in N.W.F. Province will, when completed, solve the problem of fuel shortage in the pro-

vince in addition to providing irrigation facilities to large tracts of otherwise uncultivable areas. The project is scheduled to produce 100,000 K.W. of electrical power.

The Malakand Hydro-electric scheme in N.W.F. Province will add 10,000 K.W. of hydro-electric energy to its present production capacity of 20,000 K.W.

The Thal Project on the Thal Canal in the same province will generate 7,000 K.W. of electrical energy.

The Mianwali Hydro-electric Project in West Punjab and the Sind Canal Hydro-electric Scheme in Sind, when completed, will supply electric energy to the respective provinces.

Industries—The most noticeable feature in Pakistan's economy is her backwardness in manufacturing industries and predominance of agriculture. Pakistan comprises those areas of undivided India where there was very little industrial development. Even after seven years of its creation, the country remains industrially backward. The reason for this may be traced to the agricultural economy of the country and to two other important factors, namely, shortage of fuel and deficiency in essential minerals. The country has not developed mineral resources and suffers from acute shortage of coal. General Survey.

In spite of the present gloomy picture, the future of Pakistan is quite bright. If oil, coal and iron ore are discovered on proper geological survey and foreign capital is attracted on mutually beneficial terms, this agriculturally resourceful and densely populated country will attain industrial prosperity of considerable degree in no distant future time. For achieving desired progress in industrialisation, she further requires skilled labour, supply of capital goods, a developed system of communication, free flow of capital, and, above all, proper harnessing of the country's hitherto unexploited natural resources. It may be mentioned in this connection that in recent years the country has been making great strides towards industrial development. Future.

*Pakistan's share of Industrial Establishments
in August, 1947*

Industries	Total No of establishments in undivided India	No. of establishments in Pakistan
Cotton Mills	.. 423	14
Jute "	. 106	nil
Sugar "	.. 153	11
Cement "	. 19	3
Glass "	.. 104	4
Match "	.. 113	6
Silk "	. 92	2
Soap "	.. 20	4
Chemicals "	. 38	4

About 250,000 persons are engaged in the industries of Pakistan, while the number of industrial workers in the Indian Union is over 26 lakhs.

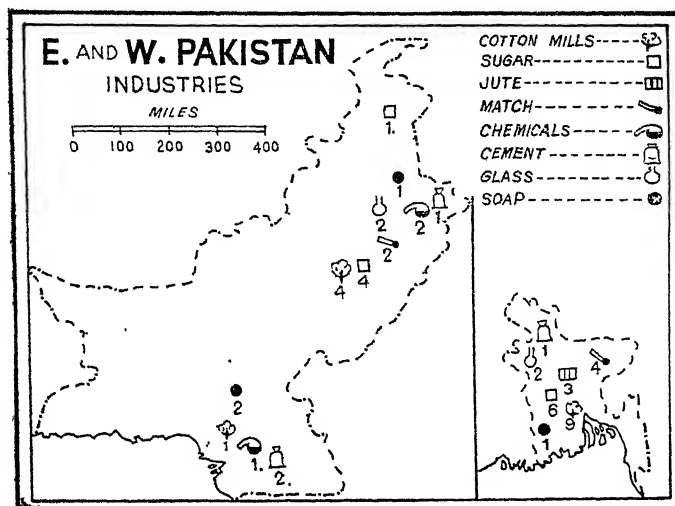
Distribution of factories. Industrial establishments are not fairly distributed among all the provinces of Pakistan. East Bengal containing over 55 per cent of the total population of the country possesses only 47 per cent of the industrial establishments, while West Punjab with only 25 per cent of the total population has more than 30 per cent of the industries located there.

Industrial Establishments and their Location in 1955

Industries	East Bengal	West Punjab	N.W.F. Province	Sind	Total
Cotton Mills	.. 9	4	—	1	14
Sugar "	.. 6	4	1	—	11
Jute "	.. 3	—	—	—	3
	(proposed)				
Match factories	. 3	3	—	—	6
Soap	. 1	1	—	2	4
Chemicals	. —	2	—	1	3
Cement	. 1	1	—	2	4
Glass	. 2	2	—	—	4
Silk	.. —	—	—	2	2
	25	17	1	8	51

Cotton Mills.—Cotton textile is the most important industry in Pakistan. There are at present 14 cotton mills, employing about 20 thousand persons. The production of these mills is below 100 million yards, while the requirement of the country is about 900 million yards per annum. This deficit of about 800 million yards, even after taking handloom production into consideration, is partially met by

imports from the Indian Union. Prospects of developing this industry in Pakistan is very great, as raw cotton of both middle and long staple varieties are abundantly grown here. Hence the Textile Industry Panel has recommended establishment of about a dozen more cotton mills in the country, mostly to be located in West Punjab.



Narayangunj, Kusthia, Khulna and Bagerhat are the centres of cotton mills in East Bengal. In West Punjab the cotton mill centres are Lahore, Lyallpur and Okara.

Jute Mills—There is no jute mill in Pakistan, though the country accounts for about 75 per cent of the total jute production of the world. All the jute mills of undivided India are located in and around Calcutta and Pakistan has to export her entire output of raw jute.

It has been proposed to establish three jute mills in East Bengal, likely to be located in Dacca and Chittagong, and the estimated products of these 3 mills are expected to meet Pakistan's present requirements of jute manufactures. The construction work of the proposed state-sponsored *Jahangirnagar Jute Mills Ltd.* at Dacca has already been started, and the mill is expected to go into production shortly.

Once the problem of shortage of fuel and paucity of capital goods is solved, Pakistan has the bright prospect of developing this industry on a very sound footing. Successful completion of the Karnafuli Project and receipt of economic aid from foreign countries will pave the way for rapid development of jute mill industry in Pakistan and thus relieve the country's dependence upon Indian Union for export of its raw jute and import of required jute manufactures.

Sugar Industry.—There are at present 11 sugar mills in Pakistan with an annual output of 30,000 tons as against her total requirement of 200,000 tons per year. This huge deficit is met partly by import from the Indian Union and partly from outside. Of these 11 factories, six are located in East Bengal, four in West Punjab and one at Mardan in N. W. F. Province. Dacca, Rajshahi, Jessore, Dinajpur and Mymensingh are the centres of sugar mills in East Bengal.

The Woollen Industry of Pakistan has been localised in Sind and West Punjab. Tweeds, rugs, carpets and blankets are manufactured in the woollen factories of these two provinces. The proposed woollen factories, one at Hannai at Baluchistan and the other at Bannu in N. W. F. Province are expected to start operation very shortly.

There are *six match factories* in Pakistan, three of them are located in Lahore and three in East Bengal.

The Cement Industry of Pakistan is well-developed. The factories are situated at Sylhet, Karachi and Wah in the district of Attock in West Punjab. The total output of these factories is 600,000 tons, 50 per cent of which is consumed within the country. There are four glass factories, two in East Bengal and two in West Punjab.

Pakistan has bright prospect of developing her *Paper Industry* in East Bengal where the principal raw material, namely, bamboo, is available in abundance in Sylhet and Chittagong Hill tracts. Recently a paper mill on moderate scale has been started at Kaphaimuk in Chittagong on the river Karnafuli and the mill went into operation in 1952.

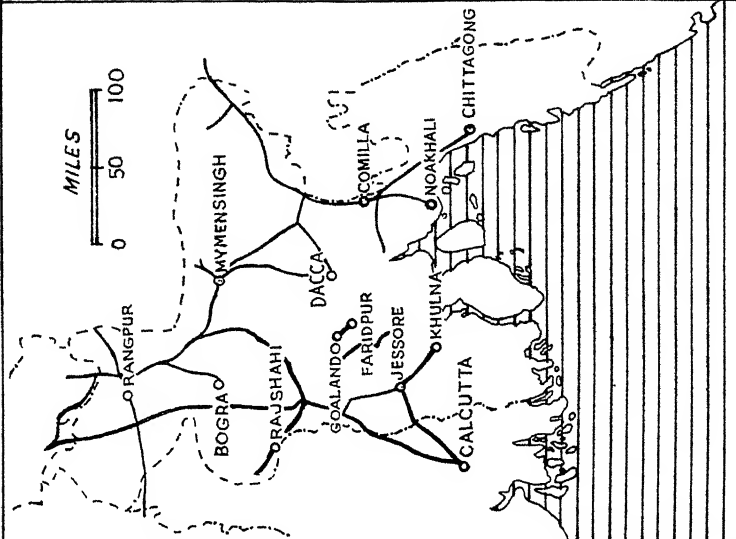
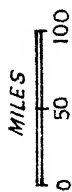
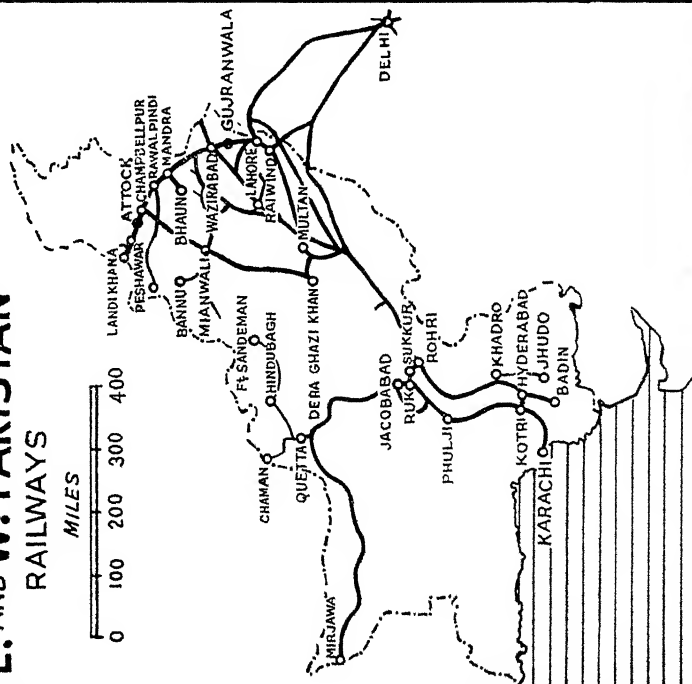
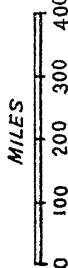
Transport—The transport system of Pakistan is not very satisfactory. The future of industrial development and agricultural progress of the country is vitally linked with an efficient and well-laid system of transportation.

Railways—In view of the vast size of the country and of the importance of linking up agriculturally developed areas with ports and trade centres, the present railway system of Pakistan is meagre and unsatisfactory. Pakistan owns 6748 miles of railway lines, inherited from undivided India. This railway mileage divided between North Western Railway in Western Pakistan and Eastern Bengal Railway in Eastern Pakistan was originally meant for serving strategic purposes in the north-western frontier of undivided India and for bringing agricultural produce to the ports like Karachi, Bombay, Calcutta and Chittagong, for export. The changed geographical boundary of the country, implementation of the bold industrial programme and scheme for developing hitherto neglected areas, call for a thorough re-arrangement and expansion of the country's present railway system. Deficiency in coal and shortage of wagons, carriages and locomotives present a great hindrance to further expansion of Pakistan's railway transport.

The North Western Railway with a total length of over 4,900 miles has its headquarter at Lahore. It serves the provinces of Sind, Baluchistan, West Punjab and N.W.F. Province. One line runs from Lahore to Peshwar via Rawalpindi and Attock and another from Lahore to Karachi via Lodhram, Rohri and Sukkur. Wheat, cotton, hides and skins and salt are the principal commodities handled by this system.

The Eastern Bengal Railway, with a length of about 1,700 miles, connects the port of Chittagong with (1) Sylhet via Comilla, (2) with Chandpur via Laksam, (3) with Bahadurabad via Narayanganj and Mymensingh. Two other lines connect Poradah with Serajgunj in Pabna and Rajbari in Faridpur and a third line goes to Domar via Iswardi. The headquarter of this system is situated at Chittagong. This line serves the jute, rice, tea and betel-nut producing areas of East Bengal.

E. AND W. PAKISTAN RAILWAYS



Roadways—As a result of the partition, about 29,000 miles of roadways have gone over to Pakistan. Of this Roads. only 3,500 miles are metalled and the rest are unmetalled.

Most of the important roads are in West Punjab and N. W. F. Province. The condition of roads in East Bengal is very unsatisfactory. Presence of innumerable rivers intercept the construction of roads in Eastern Pakistan.

Most of the frontier roads which connected undivided India with adjacent countries have gone over to Pakistan.

Pakistan enjoys the benefit of the following frontier land routes which connect Western Pakistan with Afghanistan and Iran.

(1) A road runs from Chaman in Baluchistan to Kandahar and Herat through the Khojak Pass.

(2) A branch line of the N. W. Railway runs from Quetta to Zahidan which has been linked up with Teheran by a motorable road.

(3) Another road runs from Peshwar to Kabul and Jalalabad through the Khyber Pass.

(4) One road connects Dera Ismail Khan with Kalat and Kandahar along the Gomal Pass.

(5) One road links up Attock in West Punjab with Sinkiang via Chitral and Hindukush.

In Eastern Pakistan a road runs from Chittagong to Akyab in Burma through Buthidong.

Waterways—East Bengal can boast of the longest waterways and the largest number of navigable rivers and Waterways. distributories. Absence of good roadways has further enhanced the economic importance of waterways in Eastern Pakistan.

The Padma, the Meghna and the Brahmaputra and their innumerable creeks and channels serve as the great highway of trade and commerce and of passenger traffic.

Steamers regularly ply between (1) Chandpur and Goalundo, (2) Goalundo and Narayangunj, (3) Dacca and Barisal and (4) Barisal and Lohajang.

In Western Pakistan, the Indus is navigable upto 1,000 miles from the sea. Apart from the Indus, the two tributaries, namely, the Chenub and Sutlej, are also navigable. Small country boats carry goods through these waterways.

Airways. *Airways*—Airways play a vital part in linking up the two wings of Pakistan, so awkwardly separated from each other by a distance of over 1,000 miles. Transport by airways is rapidly expanding in this country. The partition of India has left Karachi, an aerodrome of international importance, in Pakistan. In addition to Karachi, Lahore, Quetta, Peshwar, Hyderabad, Multan, Chittagong, Dacca and Sylhet are the other important aerodromes in Pakistan.

The Orient Airways Ltd. and Pak Air Services are the two Companies that maintain internal air services in Pakistan. Pakistan is also connected with Bombay, Calcutta and Delhi in the Indian Union and with Ceylon, Burma, Singapore, Teheran and Cairo.

The following are the principal air-routes of Pakistan.

1. Karachi — Quetta — Peshwar.
2. Karachi — Lahore — Peshwar.
3. Karachi — Delhi — Calcutta — Dacca — Chittagong.
4. Karachi — Ahmedabad — Bombay.
5. Karachi — Quetta — Zahidan — Teheran.
6. Karachi — Calcutta — Rangoon — Singapore.
7. Karachi — Cairo.
8. Lahore — Rawalpindi — Peshwar.
9. Karachi — Bombay — Colombo.
10. Dacca — Chittagong — Sylhet.

Pakistan air services with the Indian Union are regulated by an agreement between the two countries.

Foreign Trade. *Foreign Trade*—Pakistan is predominantly an agricultural country with very little progress in industrialisation. Hence it is quite natural that the nature of her foreign trade with countries other than Indian Union is almost of the same nature as that of India—i.e. her imports consti-

tute mill-made goods and exports comprise agricultural products.

The geographical contiguity of the two countries, the nature of their mutual needs and surpluses for exports—deficiency of Indian Union in agricultural products and shortage of Pakistan in mineral products and manufactured goods—justify a very close trade relationship between Pakistan and Indian Union.

Indian Union imports raw jute, raw cotton, oilseeds, hides and skins, grains, pulses and flour, etc. from Pakistan, while her exports to Pakistan include coal, cotton, piece-goods and yarns, jute manufactures, sugar, cement, steel, paper, tobacco, mustard oil and spices, etc.

The United Kingdom, U.S.A., France, Spain, Italy, Holland, Germany, Russia, China, Ceylon and Australia are the other countries with which Pakistan maintains regular trade connections.

Ports and Trade Centres

Barisal, in East Bengal, is an important river port. It is noted for the export business in rice, betel-nut and coconut. Ports and
Trade
Centres.

Chandpur is an important river port of Eastern Pakistan and is noted for export of rice and jute.

Chalna in Khulna in East Bengal on the river Pusoar has recently been established to handle ocean-going vessels. The port, when completed, will relieve Chittagong of its present pressure of traffic. The port will handle export trade in jute and import trade in coal and food grains. The whole of the southern part of Eastern Pakistan will constitute the hinterland of this promising port.

Chittagong is the most important port of East Bengal and is noted for the export of tea. It has become a major port since the partition of India. The situation on the Karnafuli, about 11 miles from the sea, is ideal but the formation of sand-bars creates difficulties in the way of

navigation. The other exports are jute, rice, raw cotton, etc. and the imports are chemicals, machinery, metals, salt, cotton manufactures, etc.

Dacca is the most important city of East Bengal and the administrative headquarter of Eastern Pakistan. It is a very ancient town of historical importance. Weaving of muslin and embroidery are famous from early times. Dacca is the principal centre for making bangles and buttons. It lies in the centre of jute-producing districts and is the most important inland centre for the collection and export of jute. It is noted for its cotton mills and handloom weaving industry.

Goalundo is an important river port. A great portion of the river-borne trade in jute and other agriculture products of East Bengal is done through this port.

Narayanganj is an important river port and trade centre of East Bengal. It is an important jute collecting and exporting centre. There are a few cotton mills also.

Sylhet is the chief town of the fertile Surma Valley. It is famous for oranges and lime.

Karachi—See page 191.

Lahore is the capital of the West Punjab and is the chief trading centre for the agricultural products of the province. Leather trade is important. Cotton weaving, tanneries, glass-works, flour mills, sugar mills and tobacco works are the chief industries. It is an important railway junction and the headquarter of the North Western Railway. It is the provisional Capital of West Pakistan.

Lyallpur, in the West Punjab, is a big wheat exporting centre. It is a flourishing industrial town. It is situated in the heart of the areas irrigated by the Lower Chenub Canal.

Multan is the natural collecting centre for the S. W. Punjab. It is a very old town with old local industries. It is the meeting centre of different caravan-routes from

Afghanistan through which fruits, wool, hides and skins, etc. are imported and manufactured goods, cotton textiles and sugar are exported.

Rawalpindi is an important trade centre of the West Punjab. It is the starting point for the principal routes into Kashmir. It is an excellent air-port. All the important oil refineries are located here.

Sukkur is noted for the famous Sukkur Barrage. It is also an important grain-collecting centre.

Peshwar is the capital of N. W. F. Province. It is also an important land-frontier trade centre.

Quetta is the capital of Beluchistan and a strategic town located near the *Bolan Pass*. It is a collecting centre of fruits from Afghanistan.

Dera-Ismael Khan is situated on the Indus and is an important trade centre. It has an extensive land-frontier trade with Afghanistan in fruits, wool and leather.

Questions.

1. Mention two industries which East Bengal can establish with advantage. Give your reasons.
2. What are the commodities for which Pakistan and the Indian Union are dependent on each other. Discuss the nature of trade between the two countries.
3. Write a descriptive account of the power resources of Pakistan
4. Give an account of the agricultural products of Pakistan.
5. Give an account of the mineral resources of Pakistan.
6. Give an account of the transport system of Pakistan.
7. Give an account of the present position and future prospect of industries of Pakistan.
8. Write short notes on :—Narayanganj, Chalna, Sylhet; Lyallpur, Rawalpindi, Multan, Lahore and Karachi.

APPENDIX

REORGANISATION OF INDIAN STATES

Introduction.

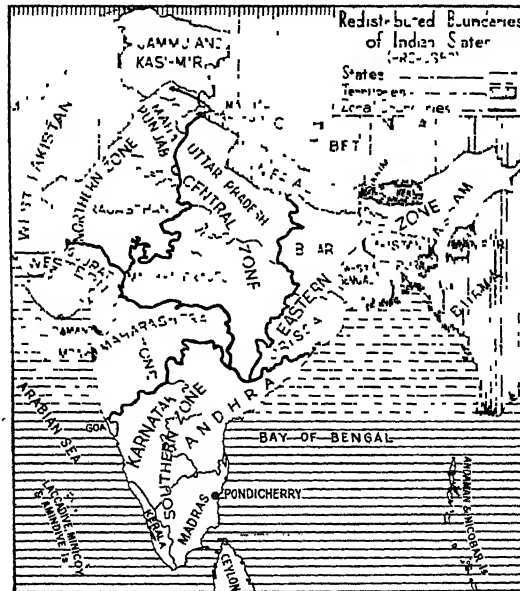
"The existing structure of the States of the Indian Union is partly the result of accident and the circumstances attending the growth of the British power in India and partly a by-product of the historic process of the integration of former Indian States. The division of India during the British period into British provinces and Indian states was itself fortuitous and had no basis in Indian history." Various factors, such as natural homogeneity, geographical contiguity and linguistic affinity were subordinated to administrative convenience and economy, and reasons of military strategy and security governed the process of drawing and redrawing the geographical boundaries of the provinces. Since the first decade of the present century, India's public opinion has always been unequivocally expressed in favour of re-distribution of provinces on the linguistic basis. The appointment of the Dar Commission and the J. V. P. Committee, both in 1948, was in pursuance of this popular demand. The Commission as well as the Committee gave due weightage to the linguistic reasons, but, at the same time, laid down factors like geographical contiguity, financial self-sufficiency, administrative convenience, capacity for future development and the wishes of the people concerned, as the guiding principles for the formation of provinces or redistribution of territories. The J. V. P. Committee had suggested that a beginning could be made with Andhra, and, accordingly, the State of Andhra, consisting of the Telugu-speaking areas of the former Madras State, came into existence on 1st October, 1953. The attainment of Independence and the integration of the Indian States added urgency to the problem of reorganisation and clothed it with further complications too. Thus in deference to the wishes of the people and in conformity with the declared principles of the Government, the appointment of the States Reorganisation Commission (S. R. C.) was announced on 29th December, 1953, to

carefully examine "objectively and dispassionately," the whole question of the reorganisation of the States of the Indian Union.

Recommendations of the Commission.

The elimination of the existing distinctions between the Part A and Part B States, the disappearance of the Part C States, substantial reduction in the number of states, and the introduction of the two centrally administered areas, namely, Delhi and Manipur, are the principal changes in the existing set-up recommended by the S. R. Commission.

The S. R. C. did not deal with the boundaries of the State of Jammu and Kashmir, preferred to leave the territories like Pondicherry and other settlements out of their considerations, and made no recommendations for disturbing the *status quo* of the Andaman and Nicobar Islands.



The recommendations of the S. R. Commission introduce major territorial readjustments in the present boundaries of the States like Bombay, M.P., and the Punjab, minor re-demarcation of geographical boundaries of Bihar, West Bengal, Madras, Rajasthan, formation of new States, such

as Kerala, Karnataka and Vidarbha and leave the present area and population of the existing States of the U.P. and Orissa, totally undisturbed.

Since the publication of the recommendations in September, 1955, dissentient views on them have been voiced by different parties and sections of the people. It is only natural that no one measure can satisfy all the mutually opposing sections ; so a compromise has to be evolved. Thus, while accepting the major recommendations of the S. R. C., the Government has introduced some minor changes, and has submitted its decision to a Select Committee for final recommendation. The isolation of Bombay, the future *Commercial Capital of India*, from the adjacent States of Gujrat and Maharastra and placing it under Central administration, the creation of Maha Punjab by the integration of the Pepsu and the East Punjab, and retention of Tripura State under Central administration, are some of the notable changes recommended by the Central Government. A Bill embodying the recommendations of the S. R. C. and incorporating the amendments suggested by the Central Cabinet as finally emerge from the findings of the Select Committee, will shortly be introduced in the Parliament. This marks the end of a great beginning of re-drawing the political map of Indian Union.

Changes recommended by the Central Government.

But this is, in no way, the final say in the matter of re-distribution of boundaries and re-organisation of States. Some of the areas have been left undisturbed for the time being, and their boundaries must be re-demarcated in course of time, and the interim arrangements in respect of some others will have to be reconsidered in the light of experience of their working in the meantime.
